This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

**Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

**About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

A

# TREATISE

ON THE

# DISEASES OF THE EYE

AND ITS APPENDAGES.

BY

RICHARD MIDDLEMORE, M.R.C.S.

SURGEON TO THE BIRMINGHAM EYE INFIRMARY, ETC.

IN TWO VOLUMES.

VOL. II.

LONDON:
LONGMAN, REES, ORME, BROWN, GREEN, AND LONGMAN,
AND JAMES DRAKE, BIRMINGHAM.

1835.

768.

BIRMINGHAM: PRINTED BY JAMES DRAKE, 52, NEW-STREET.

# CONTENTS

## OF THE SECOND VOLUME.

---

## CHAPTER XII.

PAGE

AFFECTIONS OF THE VITREOUS HUMOR . . . 1

SECTION I. Glaucoma . . . . 2

SECTION II. Various changes in the colour, the quantity, and the consistence of the vitreous humor . 21

SECTION III. Concluding remarks on the pathology of the vitreous humor . . . 23

## CHAPTER XIII.

DISEASES OF THE CRYSTALLINE LENS AND ITS CAPSULE . 25

SECTION I. Inflammation of the crystalline capsule . 32

SECTION II. Inflammation of the crystalline lens . 39

SECTION III. Dislocation of the crystalline lens . . . 42

SECTION IV. Ossification of the crystalline lens and its capsule . . . . 51

## CHAPTER XIV.

CATARACT . . . . . . 55

SECTION I. Definition of, and general observations on, cataract . . . . *ib.*

SECTION II. Causes of cataract . . . 58

*Hereditary predisposition* . . . 63

SECTION III. Diagnosis . . . . 64

*Situation of the opacity* . . . *ib.*

*Colour of the opacity* . . . 65

*Surface and figure of the opacity* . . *ib.*

*State of vision* . . . . *ib.*

PAGE

*State of the eye-ball* . . . 65

*Activity of the pupil* . . . 66

*Cataract in combination with glaucoma* . ib.

*Cataract in combination with amaurosis* . 67

SECTION IV. Prognosis . . . . . 68

SECTION V. Progress of cataract.—Mode of examining an eye affected with cataract, and various circumstances to be attended to in the investigation of such cases . , . 70

*Progress of cataract* . . . ib.

*Mode of examining an eye affected with cataract, and various circumstances to be attended to in the investigation of such cases* . . 71

SECTION V.* General symptoms of cataract . . 75

*State of vision* . . . . ib.

*Opacity.—Its characters* . . . 76

*Black shadow upon the cataract* . . 77

*State of the pupil* . . . ib.

SECTION VI. Classification of cataract . . . 80

SECTION VII. True primary cataract . . . 81

1 Anterior capsular cataract . . ib.

2 Posterior capsular cataract . . 83

3 Lenticular cataract . . . 84

4 Capsulo-lenticular cataract . . 86

*Common capsulo-lenticular cataract* . . 87

*Cystic capsulo-lenticular cataract* . . 88

SECTION VIII. Miscellaneous questions relative to cataract . 93

*Means of distinguishing hard from soft cataract* ib.

*Measures to be adopted during the progress of cataract for the purpose of assisting the patient's vision* . . . . 96

SECTION IX. Treatment of cataract . . . 99

*At what period of the existence of cataract is it judicious to operate?* . . . 103

*What are the circumstances which would decide our selection of any particular operation for the cure of cataract?* . . . 105

*When cataract exists in one eye, is it adviseable to attempt its cure by means of a surgical operation so long as the vision of the opposite organ remains unimpaired?* . . 114

*What is the description of treatment it may be adviseable to adopt preparatory and immediately antecedent to the performance of an operation for the cure of cataract?* . 117

PAGE
*Result of cataract operations* . . 121
*At what season of the year should cataract operations be performed?* . . 124
SECTION X. Operations for the cure of cataract . . 125
1 Extraction . . . . 126
*Is it adviseable to operate upon both eyes on the same day?* . . . . ib.
*Preparation of the eye for operation* . 127
*Characters and qualities of a good cataract knife* 128
*Arrangement of the patient* . . 130
*Division of the cornea* . . . 131
*Laceration of the capsule* . . 133
*Removal of the lens* . . . 135
*Division of the upper half of the cornea* . 142
*After-treatment and subsequent progress of the case* 143
*Occasional ill effects consequent on the operation of extraction* . . . 150
2 Anterior operation of solution . . 153
*Mode of arranging and securing the patient* . 154
*Characters of the needle to be employed* . ib.
*After-treatment* . . . 156
3 Depression and reclination . . 157
*Characters of the needle to be employed* . 158
*Position of the patient* . . . ib.
*Binding up the opposite eye* . . ib.
*Operation may be performed either through the cornea or sclerotica* . . . 159
*What is the exact position of the lens after the operation of depression and reclination, and what situation does it occupy?* . . 163
*Occasional morbid effects of the operation* . 169
*After-treatment* . . . 170
4 Posterior operation of solution . . 171
*Cases, and conditions of the eye, to which the operation is adapted* . . . ib.
*Preparatory treatment* . . . 172
*Arrangement of the patient* . . ib.
*After-management* . . . 173
*Occasional consequences of the operation* , 175
SECTION XI. Operation upon infants . . . 176
SECTION XII. True secondary cataract . . . 184
SECTION XIII. False cataract . . . . 190
1 *Sanguineous cataract* . . ib.
2 *Pigmentous cataract* . . . 191
3 *Lymphatic cataract* . . . 193
4 *Purulent cataract* . . . 194

PAGE
SECTION XIV. Cataract glasses . . . . 200

## CHAPTER XV.

VARIOUS STATES OF DEFECTIVE VISION . . . 205
SECTION I. Myopia . . . . . *ib.*
SECTION II. Presbyopia . . . . . 216
SECTION III. Muscæ volitantes . . . 218
SECTION IV. Hemeralopia . . . . . 225
SECTION V. Nyctalopia . . . . . 232
SECTION VI. Various visual defects in reference to colours . 234
SECTION VII. Spectral illusions . . . 238
SECTION VIII. Photophobia . . . . . 240

## CHAPTER XVI.

AMAUROSIS . . . . . . 242
*Pathological conditions causing amaurosis* . 246
*Various circumstances connected with the history of amaurosis* . . . . 251
*Age at which amaurosis most frequently appears* . 252
*Mode of examining the eye of a person suffering from amaurosis* . . . 254
*Symptoms* . . . . . 256
*Progress of amaurosis* . . . 264
*Causes* . . . . . 265
*Diagnosis* . . . . . 269
*Prognosis* . . . . . 273
*Treatment* . . . . . 275
*Illustrations of the various forms of amaurosis* . 312

## CHAPTER XVII.

MALIGNANT DISEASES AND OTHER AFFECTIONS OF THE EYE-BALL . . , . 368
SECTION I. Scirrhus of the eye-ball . . . *ib.*
SECTION II. Fungus hæmatodes of the eye-ball . 380
SECTION III. Melanosis of the eye-ball . . 446
SECTION IV. Anomalous forms of disease of the eye-ball, being of, or resembling affections of, a malignant nature . . . 465
SECTION V. Ophthalmitis . . . . . 471
SECTION VI. Dropsy of the eye-ball . . . 475
1 *Dropsy of the aqueous humor* . . 476
2 *Dropsy of the vitreous humor* . . 480

PAGE
3 *Dropsy of the aqueous and vitreous humors* . 484
SECTION VII. Suppuration of the eye-ball . . 486
SECTION VIII. Atrophy of the eye-ball . . . 494
SECTION IX. Neuralgia of the eye-ball . . 497
SECTION X. Immobility of the eye-ball . . 500
SECTION XI. Oscillation of the eye-ball . . 502
SECTION XII. Ossification of the eye-ball . . *ib.*
SECTION XIII. Protrusion and dislocation of the eye-ball . 503
1 *Protrusion of the eye-ball* . . *ib.*
2 *Dislocation of the eye-ball* . . 505
SECTION XIV. Injuries of the eye-ball . . . 509
SECTION XV. Extirpation of the eye-ball . . 515

Section XV. is marked XVI. in the text.

## CHAPTER XVIII.

MISCELLANEOUS AFFECTIONS OF THE EYE . . 525
SECTION I. Inflammation of the eye occurring after fever *ib.*
SECTION II. Inflammation of the eye, connected with, or consequent on, cholera . . 527
SECTION III. Inflammation of the eye consequent on parturition . . . . . 528
SECTION IV. Anomalous forms of inflammation of the eye 529
SECTION V. Hydatids and various adventitious and parasitical bodies in the eye . . . 538

## CHAPTER XIX.

DISEASES OF THE SEMILUNAR MEMBRANE AND LACHRYMAL CARUNCLE . , . . 543
SECTION I. Inflammation of the semilunar membrane and lachrymal caruncle . . . *ib.*
SECTION II. Chronic enlargement of the lachrymal caruncle 545
SECTION III. Fungous enlargement of the lachrymal caruncle 549
SECTION IV. Scirrhous enlargement and cancerous ulceration of the lachrymal caruncle . . *ib.*
SECTION V. Atrophy of the lachrymal caruncle . . 553

## CHAPTER XX.

DISEASES OF THE MUSCLES OF THE EYE-BALL . . 554
SECTION I. Palsy of the muscles of the eye-ball . . *ib.*
SECTION II. Strabismus . . . . . 558
SECTION III. Want of correspondence in the action of the muscles of the eye-ball producing double vision . . . . 566

PAGE
SECTION IV. Oscillation of the eye-ball . . 567
SECTION V. Nystagmus . . . . . 570
SECTION VI. Spasm of the muscles of the eye-ball . 571
SECTION VII. Atrophy and hypertrophy of the muscles of the eye-ball . . . . 572
1 *Atrophy of the muscles of the eye-ball* . *ib.*
2 *Hypertrophy of the muscles of the eye-ball* . 574
SECTION VIII. Changes which occur in the muscles of the eye-ball in the progress of various malignant diseases . . . . 576

## CHAPTER XXI.

DISEASES OF THE ORBITAL CELLULAR AND ADIPOSE MEMBRANE 579
SECTION I. Inflammation and suppuration of the orbital cellular membrane . . . *ib.*
SECTION II. Œdema or serous infiltration of the orbital cellular membrane . . . 588
SECTION III. Scirrhus of, and various malignant diseases developed in, the orbital cellular membrane 589
SECTION IV. Tumours in the orbit, for the most part developed in the orbital cellular membrane . 592
SECTION V. Increase and diminution of the orbital adipose substance . . . . 616
SECTION VI. Aneurismal affections in the orbit . . 618
1 *Orbital aneurism by anastomosis* . . *ib.*
2 *Aneurism of the ophthalmic artery* . . 627

## CHAPTER XXII.

AFFECTIONS OF THE LACHRYMAL APPARATUS . . 629
SECTION I. Injuries of the lachrymal gland . . 632
SECTION II. Xeroma . . . . 634
SECTION III. Epiphora . . . . 635
SECTION IV. Inflammation of the lachrymal gland . 637
SECTION V. Simple enlargement (hypertrophy) and atrophy of the lachrymal gland . . 646
SECTION VI. Scirrhus of the lachrymal gland . . 647
SECTION VII. Tumours in the lachrymal gland . . 658
SECTION VIII. Lachrymal tumour beneath the conjunctiva . 668
SECTION IX. Morbid tears . . . . 670
SECTION X. Injuries of the excreting lachrymal apparatus 671
SECTION XI. Constricted and patulous state of the lachrymal puncta . . . . 673

PAGE
SECTION XII. Dilatation and stricture of the lachrymal canaliculi . . . . . 675
SECTION XIII. Acute inflammation of the excreting lachrymal organs more particularly affecting the lachrymal sac . . . . . 678
SECTION XIV. Chronic inflammation of the excreting lachrymal organs more particularly affecting the lachrymal sac . . . 688
SECTION XV. Stricture and various forms of obstruction of the nasal duct . . . 692
SECTION XVI. Stillicidium lachrymarum . . 695
SECTION XVII. Dropsy of the lachrymal sac . . 697
SECTION XVIII. Suppuration of the lachrymal sac . . 699
SECTION XIX. Fistula of the lachrymal sac . . 700
SECTION XX. Congenital defects of the lachrymal apparatus 718
SECTION XXI. Extirpation of the lachrymal gland . . 720

## CHAPTER XXIII.

AFFECTIONS OF THE EYE-LIDS . . . . . 723
SECTION I. Injuries of the eye-lids . . . 725
1 *Contusions* . . . . *ib.*
2 *Burns and scalds* . . . 726
3 *Injuries from caustic and irritating substances* 729
4 *Incised and lacerated wounds* . . *ib.*
SECTION II. Concretion of the tarsal margins (*anchyloblepharon*) and adhesion of the eye-lid to the eye-ball (*symblepharon*) . . 730
1 *Anchyloblepharon* . . . *ib.*
2 *Symblepharon* . . . 732
SECTION III. Inflammation of the eye-lids . . 734
1 *Phlegmonous inflammation of the eye-lids* . *ib.*
2 *Erysipelatous inflammation of the eye-lids* . 736
SECTION IV. Cancer of the eye-lids . . . 737
SECTION V. Syphilitic ulceration of the eye-lids . 740
SECTION VI. Peculiar ulceration of the eye-lids . . 744
SECTION VII. Tumours within and upon the eye-lids . 755
SECTION VIII. Warts upon the eye-lids.—Phlyctenula.—Milium . . . . . 768
1 *Warts* . . . . . 768
2 *Phlyctenula* . . . . 769
3 *Milium* . . . . . 770
SECTION IX. Hordeolum . . . *ib.*

PAGE
SECTION X. Nævus maternus and aneurism by anastomosis* of the eye-lids . . . . 773
1 *Nævus maternus of the eye-lids* . . ib.
2 *Aneurism by anastomosis of the eye-lids* . 781
SECTION XI. Ectropium . . . . . 782
SECTION XII. Entropium . . . . . 793
SECTION XIII. Trichiasis and distichiasis . . 808
SECTION XIV. Madarosis . . . . . 812
SECTION XV. Palsy of the orbicularis palpebrarum . 814
SECTION XVI. Ptosis . . . . . 815
SECTION XVII. Twitching or quivering, and spasm of the eye-lids 823
1 *Twitching or quivering of the eye-lids* . ib.
2 *Spasm of the eye-lids* . . 824
SECTION XVIII. Morbid nictitation . . . 826
SECTION XIX. Inflammation of the edges of the eye-lids . 827
SECTION XX. Lippitudo . . . . . 835
SECTION XXI. Œdema of the eye-lids . . . 837
SECTION XXII. Emphysema of the eye-lids . . 839
SECTION XXIII. Congenital defects and malformations of the eye-lids . . . . 841

* Marked "varicose aneurism" in the text.

# A TREATISE

# ON THE DISEASES OF THE EYE.

## CHAPTER XII.

## AFFECTIONS OF THE VITREOUS HUMOR.

INTRODUCTORY OBSERVATIONS.—The vitreous humor constitutes about four-fifths of the volume of the eye-ball; its density is nearly the same as that of the aqueous humor and it is contained in, and secreted by, the hyaloid membrane. The vitreous humor is nearly of a spherical figure, its convex surface is opposed to the retina, and at its front or pupillar aspect there exists a small cavity for the reception of the posterior surface of the lens; the capsule of the lens is conjoined to the hyaloid membrane. The vitreous humor is secreted by the septa of the hyaloid membrane, and these septa or processes form small cells which have a slight communication with each other. Under circumstances of disease these septa may become absorbed, and then the eye-ball is usually soft and flaccid, and the vitreous humor is lodged, not in a number of cellules, but in one large cavity, pretty much as the aqueous humor is lodged in its secreting capsule. If the vitreous humor be discharged by accidental violence it is reproduced but not so rapidly as the aqueous humor is reproduced after a puncture of the cornea. Although the vitreous humor is beautifully pellucid in its healthy state until the middle period of life, it is prone to acquire a yellowish tinge afterwards, and in examining the eyes of many very old persons it is sometimes discovered that the vitreous humor is of a yellowish or greenish tinge, and that its septa are at the same time absorbed. I am aware that this opinion is opposed to that of the illustrious SCARPA, who asserts that in *very old* persons in whom the vitreous humor is discoloured, the septa of the hyaloid membrane remain.*

## SECTION I.—GLAUCOMA.

Many circumstances relative to this disease are still involved in considerable obscurity, although some of the appearances and symptoms which, in the aggregate, constitute this affection, have been long known, and, for the most part, very well known. For instance, in the surgical works of HEISTER, published more than a century ago, many of the characters of glaucoma are very accurately given. The following quotation from the first volume of his *Institutiones Chirurgicæ,* will be sufficient to substantiate the correctness of my assertion. "Sed, quod probe notandum, in glaucomate, secundum præstantissimorum auctorum sententiam ac doctrinam, altius sine profundius in oculo pars offuscata delitescit, coloremque subviridem sive glaucum, utplurimum simul exhibet: unde ipsum quoque nomen suum accepisse videtur." And again, "Tum rarius quoque, ut semper Medici docuerunt, glaucomatis vitium, quam cataracta, incidit; atque ubi semel invaluit, nullam prorsus curationem recipit; id quod de crystallini vitio asseverari non potest." (P. 2, Sect. 2, Page 596.) In nearly every old work on diseases of the eye we meet with the term *glaucoma*, but the notions their authors entertained of the disease so designated, were, until the time of HEISTER, very vague and imperfect.*

---

* *Edinburgh Medical and Surgical Journal,* Vol. xv.—The organization of the septa of the hyaloid membrane has been recently very satisfactorily displayed by DR. PROUT and Sir A. COOPER. Its blood-vessels are, in fact, sufficiently large and numerous to place the texture they supply in a condition to undergo the various changes which, under the influence of disease, take place in other moderately vascular serous membranes.

The definition of glaucoma as given by MR. COOPER in his admirable *Surgical Dictionary*, appears to be as satisfactory as any general definition of this disease hitherto given, and I believe it to be, as far as it goes, substantially correct. "Glaucoma" (says MR. C.) "is now defined by modern surgeons to be a greenish or grey opacity of the vitreous humor, attended with the loss or a considerable impairment of sight." This definition is at least much less objectionable than that which is given by MR. LAWRENCE; who says, the term glaucoma is employed "to denote a certain affection of the vitreous humor consequent on inflammation of that part of the eye, attended with an alteration in the colour of the pupil."

In admitting that the vitreous humor has actually undergone some change of colour, I do not mean to say that the concomitant dimness of vision is absolutely and solely dependent on the diminution of transparency this glaucomatous change comprehends, nor do I mean to assert that no other textures have experienced some morbid alteration at the same time. The dimness of vision and the greenish or yellowish opacity of the vitreous humor are two very prominent circumstances connected with glaucoma, and as being always present in a greater or lesser degree, are sufficient to justify the definition, as far as that definition goes, presented by WELLER and MR. COOPER.

---

* BANISTER, who in 1622 wrote *A Treatise of the Diseases of the Eyes, which are in number an hundred and thirteene*, evidently confounded glaucoma with cataract and amaurosis.

MR. MACKENZIE, who has lately published an elaborate article on the subject of glaucoma, has arrived at some very singular conclusions respecting its pathology, which, perhaps, as much on account of their novelty as their value, I shall very briefly examine. MR. MACKENZIE believes the following conditions to be essential characters of the disease, namely, 1, absence of the choroid pigment; 2, absorption of the septa of the vitreous humor; and, 3, increase in the quantity of that humor. MR. M—— differs from almost every preceding writer, in stating that the well-known appearances of glaucoma, (those peculiar appearances, as respects colour and opacity, which are presented on a close examination of the eye,) are independent of any opacity of the vitreous humor and change in its colour. He says that "in all the dissections of glaucomatous eyes he has made, the vitreous humor was always fluid and perfectly *transparent*." I will confine my remarks to this last part of MR. MACKENZIE's observations at present, for this is by far the most important inquiry connected with the pathology of glaucoma. And in order that I may not in any way misrepresent the opinions of MR. MACKENZIE, I will quote the *ipsissima verba* which comprise, in a condensed form, his explanation of the cause and symptoms of glaucoma, and the change wrought by it upon the eye and upon vision. "Inflammation (says he) may, perhaps, be the cause which leads to the destruction of the hyaloid membrane; and this, in its turn, may produce a series of other local changes. It is probable that the aqueous fluid, which fills the place of the vitreous humor, becoming superabundant, promotes, by pressure, the absorption of pigmentum nigrum, and at last renders the retina insensible." (708.) Now, if all this be correct, the first symptom indicative of glaucoma, is, inflammation of the hyaloid membrane, to which all the subsequent changes are referable; such as, absorption of the septa of the hyaloid membrane with an increased secretion of a "watery fluid," which, by pressure, produces the absorption of the choroid pigment and insensibility of the retina. I shall not occupy much time in attempting to refute these singular notions, for, in the same book which contains these doctrines, the author has very amply refuted them himself; when, apparently forgetful of his former visionary speculations, he has been guided merely by his ordinary method of relating the results of his observation.

Glaucoma occurs generally in advanced life, and, to adopt MR. MACKENZIE's words, "so common is glaucoma in those far advanced in life, that we may almost regard it as part of the changes coincident with old age." And here I may contrast this statement with that of SCARPA, and with the opinion of MR. WARDROP, upon this subject. The former of these gentlemen, it is well known, addressed a series of letters to MR. WISHART in which he very successfully refuted several errors into which Sir W. ADAMS had fallen, and, among other things, he denied that the vitreous humor was at all frequently in a fluid state (the more correct designation of this condition of things would be, *absorption of the septa of the hyaloid membrane)* as Sir WILLIAM had asserted; he says, "within these few weeks, I have made at least forty eyes be examined, of persons who have died between sixty and eighty years of age, and in not one was the vitreous humor found partially or wholly disorganized (rendered fluid). It was merely remarked, that the vitreous humor in old people is less transparent than in young, and that in the former it acquires a slight yellow tinge." MR. WARDROP states, that "the vitreous humor does not lose its pellucidity like the crystalline lens, but retains, even in advanced age, a perfect transparency." Old age is not the season when idiopathic inflammation of the deep-seated parts of the eye occurs with great frequency; the symptoms attending glaucoma are not, in many cases, such as usually result, nor such as would be likely to result from acute inflammation of a deep-seated texture of the eye; and moreover, if glaucoma be nothing more than a natural change "coincident with old age," how can such a change, such a process, be termed inflammatory? We are fully justified in saying that the phenomena connected with glaucoma are not always nor generally produced by any well-defined inflammation of either the hyaloid membrane or any other part. And, with regard to the choroid pigment, although I admit that it is generally removed in acute glaucoma, where is the evidence that it becomes absorbed in consequence of pressure? and, even if this be granted, what are the circumstances which prevent its reproduction?

MR. MACKENZIE has, as I before remarked, dissected several glaucomatous eyes, taken from subjects "pretty far advanced in life," and the following statement comprises the result of these dissections.

1.—"The choroid coat, and especially the portion of it in contact with the retina, of a light brown colour, without any appearance of pigmentum nigrum." The choroid coat is composed of a serous and vascular layer, and when the pigmentum nigrum is *entirely absent,* that membrane certainly does not present "a light brown colour."

2.—"The vitreous humor in a fluid state; perfectly pellucid, colourless, or slightly yellow. No trace of hyaloid membrane."

3.—"The lens of a yellow or amber colour, especially towards its centre; its consistence firm, and its transparency perfect, or nearly so."

4.—" In the retina no trace of *limbus luteus*, or *foramen centrale*." (MACKENZIE. Page 703.)

I have also dissected eyes in which acute glaucoma had existed, but the results of my examinations do not exactly accord with the preceding statement of MR. MACKENZIE. The vitreous humor, was, as occurred in the dissections conducted by Professor SCARPA, in every instance of a yellowish tinge, and the lens had undergone no other alteration than such as generally takes place at advanced life, it was, in all the cases I examined, of a green or deep-yellow or amber colour; the vitreous humor was not, as far as I could judge, *much* increased in quantity; the choroid pigment was in a great measure absent; and the septa of the hyaloid membrane were absorbed; and hence as I imagine the apparently increased fluidity of the vitreous humor. I have not included, in this brief account of my dissection of glaucomatous eyes, those cases where there exists what BEER has termed, *cataracta glaucomatosa*, where the swollen and greenish-looking lens approaches the iris and the cornea, and where indications of great change in other parts of the eye are sufficiently evident.*

There are two forms or varieties of glaucoma: that occurring in old age *(glaucoma senilis)* which is rather slight and is productive of mere impairment of vision, and is neither associated with any material degree of pain, nor, as I believe, with any inflammation, but in which the transparency of the vitreous humor is always diminished, and its colour altered either to a yellowish or greenish tinge; and secondly, that variety of glaucoma taking place from inflammation of the septa of the vitreous humor, (glaucoma inflammatoria) which is distinguished by symptoms of a more or less severe character, is often attended with chronic inflammation of other deep-seated textures (such as the choroid and retina), and usually leads to the total destruction of vision. Hence then, the appearance of the membranes and humors of the eye will not always be the same, they will vary in accordance with the particular variety of glaucoma from which the patient may have suffered, so that without asserting that the retina is never affected in glaucoma either by pressure or from an affection of, or change in, its texture, we may safely assert that it is not necessarily, nor, I believe, frequently affected.

---

* What is termed glaucoma by superficial observers of disease, is often nothing more than atrophy of the choroid coat associated with a diminished secretion of the pigmentum nigrum.

SENILE GLAUCOMA.—I will now proceed to describe what I have termed ***senile glaucoma***, which I have represented as taking place independently of any actual well-defined inflammation either of the hyaloid membrane or of any other part. The symptoms by which it will be indicated are, impairment of vision, and on examining the eye there will be seen a yellowish or greenish opacity situated deeply within the eye, and, prior to its extension forward, it will present a cupped or slightly concave surface; this appearance may be seen through the pupil, in whatever way we may inspect through it, the posterior parts of the eye, but is most conspicuous when the surgeon places himself exactly in front of the patient; and, it is very peculiar—in well-marked instances it exactly resembles a bright shining piece of metal of a yellow colour at the bottom of the eye, so that some authors have thought it necessary to say a good deal about the method of distinguishing glaucoma from various malignant affections of the globe, and particularly from fungus hæmatodes. By degrees this bright, shining yellow or greenish colour, becomes more generally and equally diffused, the shining appearance is less bright and distinct, and it eventually becomes dull and cloudy; the posterior capsule is at first a little changed in colour, and ultimately the whole of the crystalline lens acquires a yellowish or greenish tint.

I have said that this affection is one of the natural changes which almost uniformly take place in very advanced age, but I am by no means sure that it ought not in some instances to be attributed to a very mild and exceedingly chronic inflammation of the hyaloid membrane—the septa of the vitreous humor; however, this latter supposition is rendered rather improbable;—first, because glaucoma, or, in other words, change in the colour and transparency of the vitreous humor, occurs in a certain degree in almost every *very old* person; and secondly, because, in the instance under consideration, there are no post-mortem evidences of inflammatory changes in the eye, nor do the subjects of this pathological change usually complain of much pain or uneasiness in the eye.

This senile glaucoma never proceeds so far as to destroy vision entirely, but its progress is marked by an increasing diminution of sight. The septa of the vitreous humor are generally, but not always, absorbed, the choroid coat and the retina being perfectly natural, and the dimness of vision solely referable to the dulness of the vitreous humor and the diminished susceptibility of the retina. When the hyaloid membrane is entirely absorbed, the secretion and absorption of the vitreous humor are equally prevented, and its (the hyaloid membrane) frequent absorption in old age, is, in my opinion, accomplished for the useful purpose of preventing that loss or extreme imperfection of vision, which would result from the flaccidity and flattening of the globe, unless it were prevented from taking place by the annihilation of the secreting and absorbing surfaces. We know the predominant influence of absorption in old age, and we know also, that however slight may be the inconvenience this occurrence produces in many other parts, it would be, in the case before us, a source of material detriment to the free exercise of one of our most agreeable, useful, and cheering senses, if some measures were not employed by nature to prevent it from taking place to any material extent. It appears to me, that the changes the respective parts of the human body undergo in advanced life, as a necessary effect of old age, have never been properly explained, nor minutely described.*

The usual consequence of the continued residence of a transparent fluid in any part of the living body, not destined to remain there for more than a very limited season, is, a diminution of its transparency, and, in this way, in the instance under consideration—that is, by the prolonged residence of the vitreous humor in the eye in those cases where the part which formerly secreted it, is absorbed—the loss of transparency of that humor may be explained; and when glaucoma occurs in old persons, only to the extent to which I am now presuming it to exist, I believe that the dimness of vision it occasions, is fairly referable to the want of transparency in the vitreous humor alone.

---

* It appears to me that a very useful work might be written *On the effect of age on the various textures and organs of the human body.* We do not sufficiently discriminate between *mere natural changes* and *decided morbid alterations.*

The important question here arises—namely, are the septa of the vitreous humor *usually* absorbed in very advanced life? I believe they are, under the following circumstances, not merely from the examination of the eyes of many aged persons who have suffered from fully developed glaucoma during life, but also from various sources of collateral testimony. In performing the operation of extraction in old persons, a portion of the vitreous humor sometimes escapes, or, in order to render the expected inflammation milder, the surgeon may prefer to discharge a portion of the vitreous humor, and in both these cases the evacuated fluid will stream from the eye in a pretty free current, not *guttatim*, as when in the perfectly healthy eye we puncture the hyaloid membrane, but in one free coutinuous stream. Surely this could not happen if the cellular arrangement of the hyaloid membrane still existed in a state of integrity.*

The chambers of the eye become diminished, and the cornea flattened, in old age, in consequence of the lesser diminution of the absorbent compared with the diminution of the secreting function on the part of the membrane which exudes the aqueous humor, and if its surface could be placed in the same condition as that presented by the *septa* of the vitreous humor—or, in other words, if the serous membrane, lining the chambers of the eye, became absorbed in advanced life, I have no doubt that this shrinking and flattening of the anterior surface of the eye would cease to be noticed, and that we should not, when arrived at "a good old age," become far sighted. Annihilation of the power of secretion, would, under this condition of things, involve the loss of the power of absorption, and presuming the eye to be left in a state of plenitude, it would so remain, and would not then become, as it now does, a little flattened.

---

* The loss of a portion of the vitreous humor was formerly supposed by many surgeons to be followed by the destruction of, or serious injury to, vision; thus WARNER speaks of the loss of a considerable portion of the vitreous fluid in the operation of extraction as being probably succeeded by "a depressed globe attended with irrecoverable blindness." *A Description of the Human Eye*, p. 77. There is some exceedingly curious information "De artificio oculorum humores restituendi," in a letter addressed by F. J. BURRHUS, to his friend, BARTHOLINUS. I shall speak of the circumstances connected with the reproduction of the vitreous humor in the chapter on cataract.

*Treatment.*—I need scarcely remark that no remedies will interrupt the progress of *senile glaucoma*, and that no treatment whatever is required, unless there are present distinct indications that this change is much increased by the existence of chronic inflammation of the septa of the vitreous humor or of some neighbouring texture; if this be the case, it will be necessary to prescribe mild purgatives, perhaps also a little mercury, institute some plan of permanent counter-irritation, and proscribe all employment of the eyes by artificial light, and in avocations requiring minute vision.

ACUTE GLAUCOMA.—This affection *commences* with inflammation of the hyaloid membrane; the retina and choroid become implicated; the septa of the vitreous humor become absorbed; the vitreous humor increased in quantity and changed in colour so as to acquire a dirty-yellowish or greenish tinge; and the retina is eventually rendered insensible or nearly so. MR. LAWRENCE would appear to consider that this state of things always arises from an inflammatory condition of the choroid, the retina and the hyaloid membrane, but I have explained that all the symptoms connected with acute glaucoma *may* proceed from a primary inflammation of the hyaloid membrane alone.

*Pain.*—There is a certain degree of pain attendant on inflammatory glaucoma from the first, when we have no reason to suppose that the inflammatory action has extended to the choroid and retina, but, as the disease advances, the pain becomes increased, although it is never so severe as in acute inflammation of the deep-seated textures generally. Indeed the greater part of the pain is very probably referable to the tension of the globe which, in consequence of the increase of the vitreous secretion, generally takes place; this tension of the globe is very evident on applying the slightest pressure—the eye-ball feels extremely hard, and the sclerotica unusually tense.

*Redness.*—At the commencement of the attack there is no, or scarcely any, increase in the superficial redness of the eye-ball, but, in the progress of the malady, and particularly when other textures become involved, there is often a pretty general varicosity of the external vessels of the eye, and this is more likely to happen when the disease occurs in a gouty individual. This, however, forms no necessary part of the symptoms of glaucoma, it may or may not happen, and when it does take place it must be considered an accidental addition to, rather than a symptom of, glaucoma;* it is one of the diseases which may exist in combination with glaucoma, but it may also exist independently of it—when it does occur, it is termed varicosity of the eye-ball.

*Changes in the appearance of the lens and vitreous humor.*—Inflammation of the hyaloid membrane renders its secretion of a greenish or yellowish colour, and this latter tinge is sometimes as deep as the straw-coloured serum occasionally removed from a dropsical patient. This change produces a very singular effect; when seen through the crystalline lens it has a bright metallic colour and seems to be situated quite at the bottom of the eye, it possesses a cupped or slightly concave surface, and may be distinguished in almost every direction in which it may be viewed, but it is most distinctly perceived when the eye is examined in front; by degrees it approaches the lens, and then there is a more generally and equally diffused yellowness or greenness, its brightness is less conspicuous, and it may even become cloudy or muddy—not a *clear* but a *dirty* yellow or green; finally the lens becomes affected and assumes a greenish or a yellowish hue.

---

* It is, however, stated by WELLER, that "glaucoma is always the consequence of a more or less evident gouty inflammation of the eye-ball." MONTEATH's translation of WELLER's *Manual*. Vol. 2, p. 27.

*State of the pupil and condition of vision.*—The pupil is at first slightly dilated, and in the progress of the disease this dilatation of the pupil increases, and the German ophthalmologists lay great stress upon the state of the pupil among the diagnostic symptoms of glaucoma, and they say that it is elongated in the lateral direction, similar to the pupil of graminivorous animals. But this change in the figure of the pupil is certainly not always present and does not appear to be at all necessary to the full development of a well-marked case of glaucoma. Vision is at first slightly impaired, this impairment of sight continues to increase, until the patient is rendered almost or totally blind, and this too, although the change in the vitreous humor may not be more considerable than that which has occurred in many other persons, who, although suffering from *senile* glaucoma, still retain a very useful degree of sight. The dimness of vision cannot therefore depend on the mere want of transparency in the vitreous humor. There are other circumstances capable of producing this dimness of vision. In the first place, the retina is compressed by the increase in the quantity of the vitreous humor; and, in the second place, the retina and the choroid may be conjointly inflamed, and may be presumed to have very generally undergone, in the progress of the affection, some organic change adequate to destroy in a great measure the susceptibility of the retina. At the same time it must be remembered that the absence or great diminution of the choroid pigment is, in itself, sufficient to induce great confusion of vision when its absorption takes place in the eye of an individual in whom it had formerly existed. In the progress of glaucoma and even after all useful vision has been destroyed by it, patients will often complain of scintillations, or small balls of fire which appear to flash before their eyes very abundantly and in an extremely sudden manner, and which greatly distress them.

In stating that when acute glaucoma has proceeded to a severe extent, the septa of the hyaloid membrane are absorbed, I should also have pointed out the mode in which this absorption is induced. The septa of the hyaloid membrane secrete the fluid they respectively contain, and when the quantity of this fluid is much increased, these cells are broken down or absorbed by the increased pressure which, under such circumstances, they sustain. The cellules are first distended, and secondly, either broken down or absorbed.

*Causes.*—Glaucoma is not mentioned by SCARPA in the early editions of his *Treatise on the principal diseases of the eye*, and we must therefore presume that it did not come very frequently under his observation, and indeed many facts lead me to infer that glaucoma is extremely prevalent in some parts of the world, and scarcely occurs at all in others, and that therefore come circumstances in the climate, the diet or the general habits of the individuals, at present beyond our knowledge, establish a predisposition to its invasion. Inflammation of the hyaloid membrane, however produced, is one of the principal causes of the symptoms which, when present, are designated in the aggregate, acute glaucoma. I have already explained my reasons for supposing that the absence of the choroid pigment in some cases of inflammatory glaucoma is not caused by the pressure exerted on the choroid tunic, by an increase in the quantity of the fluid contents of the globe, believing the absence of that secretion to depend more on prolonged inflammation of the choroid itself, than on pressure, which would be as likely to produce the absorption of the membrane as of its pigment.* The absence of the choroid pigment forms no essential condition of senile glaucoma; it may exist quite independently of the absorption of the choroid pigment, and be indicated by nothing more than an impairment of vision dependent on the diminished transparency of the vitreous humor and the diminished sensibility of the retina, in common with the lessened sensibility of the nervous system in general; but the degree of dimness of vision will be modified by the quantity of labour which has been imposed upon the retina at an early period of life, and the circumstances under which that labour has been performed. It will be borne in mind, that a particular pathological condition of the retina may be superadded to simple glaucoma, and that the sensibility of the retina is always impaired when the free access of light to it, is for many years interrupted, throughout its entire extent, in each eye.

---

* Atrophy of the choroid coat may induce an impairment in the qualities of its pigment and more especially in its quantity. Sub-acute inflammation of the choroid, may lead to a state of hypertrophy of that tunic, and thus give rise to an increase of its secretion, or it may, of course, originate some new secretion, such as serum or lymph, (*common* or *modified*). A still higher degree of inflammation, may cause the accretion of its two layers, or by coating its secreting surface with lymph, may deprive it of the power of producing its proper pigment. Hence it will appear that, as far as the condition of the choroid forms a part of the symptoms of glaucoma, they are liable to undergo many *actual*, and a still greater number of *apparent*, variations.

*Diagnosis.*—The progress of *acute* glaucoma is characterized by pain; the opacity is situated at first very deeply in the eye; the dimness of vision is so considerable that the dull state of the humors would alone be inadequate to produce it; and the eye-ball is remarkably firm and tense. Attention to these circumstances will enable us to distinguish glaucoma from cataract, which is the only disease with which it is *very liable* to be confounded.*

*Prognosis.*—The inflammation of the hyaloid membrane, which we have pronounced to be the first step towards the production of acute glaucoma, is extremely insidious in its mode of origin, and slow in its progress, so that we are sometimes not apprised of its existence until we witness it in conjunction with some of its effects, such as, dimness of vision, and change in the colour of the vitreous humor, when indeed no remedies we may employ will restore the sight to its original state of perfection. Our remedies will not restore the transparency of the vitreous humor, for the absorbing surface which formerly removed it is very probably destroyed; neither will they induce a fresh absorption of pigmentum nigrum in the place of that which has perhaps been removed; but, as they sometimes *arrest* the *progress* of glaucoma, and *prevent its occur-*

---

* The retina may undergo various organic changes which are not always easily distinguished, from the appearances present in glaucoma. The state of the eye-ball, as respects its degree of tension; the situation of the cloudiness seen through the pupil, particularly as regards its profundity; and the condition of vision, are the usual events which distinguish the occurrence of changes in the texture of the retina, from the appearances connected with glaucoma. The deposition of lymph into the vitreous humor is more likely to be confounded with fungus hæmatodes than with glaucoma.

*rence in the opposite organ*, it would be improper to give a very despairing prognosis when called to such a case at an early stage of its existence. The disease may be *sometimes* arrested by the adoption of proper measures, but if it be neglected, the total loss of vision is almost inevitable.

*Treatment.*—The treatment of inflammatory glaucoma will be regulated by the severity of the symptoms and the constitutional peculiarities of the patient. If there be much pain in the eye with uneasiness in the head, cheek, and eye-brow or around the entire orbit, it would be advisable to direct the abstraction of blood either by cupping or by leeches, and this will be the more necessary, if, as by no means seldom occur, symptoms of general ophthalmia or of a congested state of the eye and head, are present. At the same time prescribe mercury, not indeed so freely as in some other more acute inflammatory affections of the eye, but in a more moderate quantity, say, five grains of the blue pill night and morning, and this quantity may be continued until all sense of fulness and uneasiness of the eye-ball has disappeared, unless the gums are much affected before that beneficial change occur. When you are unable to administer mercury with the view of slowly and slightly affecting the gums, you may prescribe active aperients, which should be continued throughout the duration of the disease, so long as any symptoms requiring, and likely to be benefited by, treatment, remain.

A seton or a blister to the temple or above the eye-brow will be necessary, in fact, counter-irritation constitutes a very important part of the treatment of glaucoma, and one which ought never to be neglected. The friction of tartar emetic ointment between the shoulders, and at the upper part of the spine, has been strongly recommended, but I do not know that this method of exciting counter-irritation possesses any advantages not to be obtained from the insertion of a seton or the application of repeated blisters in the situation I have mentioned; and if no superior advantages, as respects the affection of the eye, be connected with it, it is decidedly inferior to them, inasmuch as it is a more uncertain, more tardy, and more painful mode of exciting counter-irritation. If you wish to produce a slight degree of irritation in the neighbourhood of the eye very quickly, you may wash the temple with a little water, and leave the part a little moist, and afterwards gently smear over its surface the solid nitrate of silver—in this way you may produce irritation of the skin very promptly, and limit its extent just as may be desired. As there is a preternatural fulness of the globe it may be desirable to puncture the sclerotica, and I should advise that this be done whenever there is much local pain evidently depending on the tension of the globe, and particularly when vision is nearly destroyed and the opposite organ is becoming similarly affected.[*] A very fine grooved needle passed into the sclerotica at about three or four lines behind the margin of the cornea will enable you to discharge a portion of the vitreous humor very readily, and with infinite relief to the patient. The only other circumstance to which it is necessary for me to direct attention, is, to pass the grooved needle obliquely backwards, not horizontally or directed anteriorly, for unless you adopt this precaution, you may, when the lens is present, aggravate the patient's sufferings instead of relieving them, by displacing the lens. In one or two cases of glaucoma where the muddiness of the vitreous humor has been evidently consequent on the inflammation of the parts which secrete it, I have, on the subsidence of the inflammation of the hyaloid membrane, discharged the greater part of the turbid fluid by means of a fine grooved needle in the hope that the new secretion would be more transparent, and I am confident that I have more than once practised this operation with the greatest advantage to my patient's vision. This, then, is a mode of viewing the remedial agency of the evacuation of the vitreous humor perfectly distinct from that which contemplates merely the relief of tension of the globe. Again, it has been proved by experiments on animals, that the vitreous humor may be almost entirely discharged, and afterwards replaced by a transparent watery fluid without any material injury to vision: might we not take advantage of our knowledge of this fact, and, when all inflammation of the membrane which secretes the vitreous humor has subsided, evacuate that turbid secretion by means of a very small fine-pointed canula, and afterwards inject a quantity of clear luke-warm water. I can imagine that cases may exist which may render it advisable to perform this operation, and I shall certainly try the experiment in the first favourable case for the purpose which falls under my care.

---

[*] The following passage, respecting the treatment of glaucoma, occurs in the work of Demours.—"J'ai toujours éprouvé quelque desir de faire fondre le premier œil attaqué, dans l'espoir de sauver l'autre. Je ne l'ai pas encore fait; j'ai eu connaissance que cette tentative a été exécutée, et qu'elle n'a pas mis le second œil à l'abri, quoique l'opération eût été faite, lorsque celui-ci était encore très-sain. Saint Yves avait pensé que l'on pourrait faire, dans les cas semblables, l'extirpation du globe pour préserver l'autre." Tom 1, p. 472.—In the many cases of glaucoma I have witnessed, the disease has generally affected both eyes, almost simultaneously, but not in an equal degree. However, the sympathy of the healthy with the diseased eye, is a fact never to be lost sight of in the management of ophthalmic disease.

Many surgeons deem it advisable to employ belladonna during the progress of every case of glaucoma which they are unable to arrest, and, by means of this extract smeared around the eye, or by dropping a solution of it into the eye, we may certainly secure to the patient every advantage which the condition of his organs of vision permits him to enjoy, and although this method of management is merely of a palliative character it will generally very agreeably increase the patient's power of vision, until, indeed, the retina becomes totally insensible.

In conclusion, glaucoma may or may not be connected with inflammation of the septa of the hyaloid membrane and the neighbouring textures, so that its treatment will vary in accordance with the pathological state of those parts of the eye in and near which the disease actually exists.

### SECTION II.—VARIOUS CHANGES IN THE COLOUR, THE QUANTITY, AND THE CONSISTENCE OF THE VITREOUS HUMOR.

The vitreous humor may be rendered morbidly fluid, and the eye-ball may become preternaturally soft, and this change is designated, synchisis, or solution of the vitreous humor. I cannot say that I have often remarked this increased fluidity of the vitreous humor (it is not naturally a dense fluid) although I have repeatedly observed a diminution of its quantity, with consequent softening and flaccidity of the globe. I am confident, that what is often termed increased fluidity of the vitreous humor is, in fact, nothing more than a destruction of the cellular arrangement of the hyaloid membrane, and that the vitreous humor itself has undergone no change of density.

The vitreous humor may acquire an increased density, and may undergo various changes in its colour; many such cases are recorded, but, I believe, no successful method of cure has been hitherto proposed. This variety of disease generally produces a certain degree of dimness of vision, and may excite severe pain or otherwise, just as the opacity may be great or trifling, or the tension of the globe much, or only slightly, increased.

Increase of the vitreous humor usually results from inflammation of the membranous surfaces which secrete it, and as the product of such inflamed surfaces is for the most part cloudy and discoloured, the disease is termed glaucoma; on the other hand, any material diminution of the vitreous humor induces a condition of the eye, which is termed *synchisis oculi* or *atrophia bulbi.*

Various changes in the colour of the vitreous humor have been mentioned by authors, and in some cases the changed secretion has led to a suspicion that the eye was the seat of malignant disease. The risk of error is not, however, very great, as I shall presently more particularly explain. If from any of these causes the eye-ball is painfully tense, its tension may be removed by the operation of tapping, and if inflammation be present it may be treated by the usual means.

Hæmorrhage sometimes takes place into the vitreous cells, and usually either from forcible straining, as during the act of vomiting; from blows upon the eye; or from certain tendencies to apoplexy, or increased circulation in the head. Its cause is generally distinctly ascertained; its appearance clearly indicates the nature of the occurrence; its presence excites very little irritation, and, as far as the mere effusion of the blood is concerned, it leads to no injurious consequences and is speedily absorbed. When it arises spontaneously (I mean independently of violent straining or local injury) it is a symptom which ought not to be neglected, inasmuch as it is sometimes an indication of a plethoric state of the system, which, if permitted to remain, may terminate in apoplexy. Of course, it will, on its own account—as regards the mere presence of blood in the vitreous humor—require no treatment; but the blow or other injury may produce inflammation, which may demand attention in order to obviate the injurious effects such inflammation has a tendency to induce. The time when this effusion is most likely to be confounded with malignant disease of the eye-ball, is, when a part of the blood is absorbed, but I shall speak more fully upon this subject in my remarks on " Fungus Hæmatodes of the Eye."

### SECTION III.—CONCLUDING REMARKS ON THE PATHOLOGY OF THE VITREOUS HUMOR.

I have stated that the hyaloid membrane may become inflamed and absorbed, that its secretion may be increased, and that hæmorrhage may take place into its cells, and I may mention that it may also secrete pus and lymph, and that it may become the seat of ossification.* Chronic inflammation of the septa of the hyaloid membrane may thicken them and render them opaque, but its more usual effect I have already stated when treating of glaucoma.

We must view the pathology of the vitreous humor as that of every other part, in connexion with its anatomy. The capsule of the vitreous humor is a serous membrane, and is liable to all those diseases to which other serous membranes are exposed. If these changes are not mentioned or described until a comparatively recent period, we may be assured that the omission arose from the prevalence of the singular and contracted notions which were formerly entertained respecting the pathology of the eye, and to the confinement of the management of its maladies to a distinct, and generally very ignorant, class of persons, termed "oculists." It would seem from the expressed opinions of some writers that the organ of vision was composed entirely of "sui-generis textures," which were by no means obnoxious to those morbific agents which we acknowledge to originate disease in other parts consisting of similar anatomical structures—that they were, in fact, incapable of undergoing many of those diseased changes to which the same textures when forming other organs, are known to be obnoxious.

---

* Cases of this latter description are related by MORGAGNI, LOBSTEIN, BAILLIE, BEER, SCARPA, WARDROP, WARREN, and KUHN.

# CHAPTER XIII.

## DISEASES OF THE CRYSTALLINE LENS AND ITS CAPSULE.

ANATOMICAL AND PHYSIOLOGICAL REMARKS ON THE CRYSTALLINE LENS AND ITS CAPSULE.—The crystalline capsule is an extremely delicate serous membrane, situated behind the uvea and between it and the vitreous humor. The crystalline capsule contains the lens and secretes, on its lenticular surface, a minute portion of transparent fluid, termed the liquor Morgagni,* and which, in the opinion of some authors, and of the celebrated RICHTER, and of BEER and WENZEL in particular, may become opaque and turbid and constitute a distinct species of cataract, which is usually designated *cataracta morgagniana.*

HALLER and BICHÀT have considered the structure of the crystalline capsule to bear a very close analogy to that of the cornea. I do not perceive that its secreting surface differs from that of an ordinary serous membrane except in its greater delicacy.

The crystalline lens is, in the adult, a transparent substance of a double convex figure and of a mucilaginous consistence—the consistence of soft jelly—externally, its centre or nucleus being much denser and more compact. The lens is much softer in the fœtus and of a reddish tinge; in early life it is also exceedingly soft; but soon after adult age it becomes much firmer, and it is said, but erroneously, as I think, that its size diminishes just in proportion as its firmness increases. By the application of heat the crystalline may be separated into three principal parts or divisions, which, when forced from each other, constitute separately a somewhat triangular and wedge-like body, the apex of which is thick in its antero-posterior direction, and forms, in the natural relation of parts, a portion of the centre of the lens. Each of these triangular divisions of the lens is composed of a series of lamellæ placed one upon the other similar to the layers of an onion.

---

* PORTAL (*Anatomie Médicale*) and BAERENS (*De systemate lentis*) have denied that it exists as an appreciable quantity of fluid during life. This fluid is supposed by some authors to constitute the medium by which the lens obtains its nutrition; thus PORTERFIELD remarks that the capsule of the lens "furnishes that crystalline liquor, which is sent into its cavity, for nourishing the crystalline. Vol. 1, page 239.

The structure of the lens has been represented by many of those who have closely investigated its anatomical characters to be muscular, and many anatomists who deny its muscularity have admitted that it possesses contractility, elasticity, and vascularity. DR. YOUNG and JOHN HUNTER believed that the crystalline lens was muscular, and to the action of the muscular fibres of which they believed it to be composed, they attributed those changes in its figure which they presumed it underwent, in the attentive inspection of extremely proximate or very remote objects. Neither of these celebrated men assumed its muscularity merely from any process of analogical reasoning, but actually demonstrated this interesting fact, as they believed, in the most conclusive and satisfactory manner. Now, of course, we are justified in assuming from their statement, that they were convinced the crystalline lens was nourished by the circulation of blood throughout its substance, for that is the only admitted ultimate source of nutrition by which such structures are sustained and supported; in fact, DR. YOUNG pointed out the existence of blood-vessels in the lens and he represented them as being particularly numerous near its greatest circumference.* He did not succeed in tracing nerves into the body of the lens though he believed them to exist throughout the whole of its structure.

Professor WALTHER, in the course of some highly interesting remarks on *lentitis*, has pointed out the development of a beautiful vascular wreath within the substance of the lens in the progress of the inflammatory affection, which, however, he considers to be a morbid process, and to be effected in the same way as occurs in the extension of vessels into an inflammatory lymphatic product. This inference, however, must certainly be incorrect, for, if the vascular wreath to which the Professor alludes was actually seated in the substance of the lens, there can be no doubt that it was composed, in the instance to which WALTHER refers, of the natural vessels of the part enlarged under a condition of inflammation. At all events, if the development of this vascular wreath in the situation mentioned by WALTHER were, in fact, the organizing vessels of a lymphatic product, either the part must have undergone some enlargement in consequence of this additional deposit, or a portion of the original structure corresponding to the volume of the recently secreted lymph must have been absorbed, (unless indeed we admit that the texture of the crystalline had become compressed within its capsule) but as neither of these events are stated to have occurred—and it would be a great injustice to the candour and discerning observation of the learned Professor to suppose that if they had taken place he would not have noticed them and announced their existence—we are compelled to dissent from the opinion so ingeniously and plausibly supported by the enlightened and indefatigable Walther.

---

* DR. PROUT has contributed an interesting paper "on the vascularity of the eye," to the thirtieth volume of the *London Medical and Physical Journal*, and he there asserts that "with respect to the lens itself, there is certainly a vascular connexion between it and its capsule, if not all over its surface, at least at its circumference."

Again, many excellent anatomists have ascertained, or, at least, represented that they have ascertained, the existence of blood-vessels in the substance of the lens in some animals as well as in the human subject, and there is strong evidence of its organization in the nature and varied character of the morbid processes to which it is subject.*

With regard to the use of the lens I will merely remark, that it transmits and powerfully refracts the rays of light in their passage to the retina, and that it very probably contributes to the adaptive power of the eye, the establishment of which fact was the chief object of the minute description of its muscles and their tendons, which the late Dr. Young has given in the *Philosophical Transactions.* We can see as well, or nearly as well, at a variable distance, within certain limits, without the aid of glasses, which could not take place if the refractive power of the eye were always precisely the same; it is necessary, therefore, that the organ of vision should possess an adaptive power, that its refractive capacity should vary in accordance with the distance of the object we may be engaged in examining. There are various modes in which this change in the refractive capacity of the eye—this adaptive power of the organ of vision—so necessary to perfect and accurate vision, may be supposed to be accomplished. It is said to be produced by a change in the degree of convexity of the cornea, in the figure of the globe, in the magnitude of the pupil, or in the form or situation of the crystalline lens. I believe the lens does possess a capacity to vary its degree of convexity,* and consequently, to modify the refractive power of the eye.

---

* A good deal of information respecting the anatomy and mode of development of the crystalline lens may be found in the writings of Hovius, Albinus, Winslow, Camper, Senac, Mœhringius, Reil, Petit, John Hunter, Young, Home, and more particularly in the works of Leuwenhöek, (*Arcana naturæ detecta.*) Zinn, (*Descriptio oculi humani iconibus illustrata.*) Soemmering, (*Icones oculi humani.*) Meckel, (*Manual d'anatomie.*) Baerens, (*De systemate lentis.*) Walther, (*Practical essays in surgery and ophthalmology.*) and Leiblein, (*Observationes de systemate lentis crystallinæ mammalium atque avium.*)

It is a question if the lens is reproduced when it has been removed—whether it is capable of being regenerated when it has been wholly extracted from the eye. I have performed a series of experiments upon various animals for the purpose of ascertaining this fact, and the conclusions at which I have arrived, are—1, that the lens may be reproduced if it be carefully extracted from the eye without materially injuring the capsule or exciting much inflammation; but that—2, many accidents, such as the destruction or extensive rupture of the capsule, the accretion of its two hemispheres, the supervention of acute inflammation, and so on, may interfere with and prevent its reproduction. I have detailed some of these experiments in the tenth volume of the *London Medical Gazette*.†

---

[*] In a note to a "Sketch of Animal Chemistry," published by the late DR. YOUNG, the learned author asserts that "the arguments in favour of a spontaneous change of form in the lens, by its own powers, are direct, and, if I am not mistaken, demonstrative." *Medical Literature.* Second edition, page 549.

[†] The opinions of M. M. COCTEAU and LEROY D'ETOILLE, in reference to the reproduction of the lens, are very fully explained in the seventh volume of the *Journal de Physiologie*. The still more

M. MAYER has given an account (*Journal Complémentaire* for Jan. 1833) of several experiments performed by him in order to ascertain if the lens is reproduced after it has been once extracted, and the result of his experiments correspond with the conclusions at which I had formerly arrived. M. MAYER remarks, that "the shape of the new crystalline is generally that of a three-quarter moon, the horns of which nearly touch each other." This statement is so accurately explanatory of a preparation I sent to the editor of the *Medical Gazette* (and which I suppose is still in his possession) many months before MAYER's opinions were published, that I can almost fancy its author has furnished his description from it. At all events, the state of the eye at a given period after the removal of the lens, as represented by M. MAYER, corresponds as nearly as possible to that I have repeatedly noticed, and which I had described previously to the publication of his interesting remarks on this curious subject.

It seems to me indispensible to the reproduction of a true crystalline lens that—1, one hemisphere of the capsule should be but little or not at all injured;—2, that the mode in which it is removed should not excite any prolonged acute inflammation;—3, that it should not induce opacity of the texture of the capsule;—4, that the two hemispheres of the capsule should not unite; and that, —5, an entire condition of the posterior hemisphere and a trifling division only of the anterior hemisphere of the capsule, are events extremely favourable, if not absolutely essential, to the reproduction of the crystalline body.

The new lens is a secretion from the capsule, only

---

elaborate paper of BACKHAUSEN "De regeneratione lentis crystallinæ" may be conveniently referred to in the *Scriptores Ophthalmologici Minores*, vol. 3.

slightly consistent when first produced, but gradually acquiring increased solidity. The period which may elapse from its first visible formation to its complete development varies in different animals, but in rabbits the average period is about six months. I have removed a regenerated lens in a tolerably complete state, after having extracted the original one only three months previously. It is remarkable that I have never yet detected the lamellar arrangement in the newly formed substance; it does not divide, as the original lens does, into three parts, by the application of acids or heat, neither can any thing like a lamellar arrangement be detected in any part of its texture, at least, as far as I have been able to ascertain. I shall not pause to point out the different appearances of the new lens at various periods of its regeneration, for these appearances are very fully and accurately represented in some of the papers to which I have already directed attention. There are, of course, many reasons why the lens is not more frequently reproduced in the human subject after it has been taken away for the cure of cataract, but the chief cause is, unquestionably, the injury and frequently the destruction of the capsules in the attempts to remove it. And, it will not be forgotten, that an opaque capsule does not possess the power of secreting a new lenticular substance.*

---

* Various surgeons have noticed the reproduction of the lens in the human subject, but I have never had an opportunity of ascertaining this fact so unequivocally as MR. GUTHRIE appears to have done in the case related in his recently published pamphlet (*On the certainty and safety with which the operation for the extraction of a cataract from the human eye may be performed, &c.*, page 43.) I question if it is possible for the lens to be regenerated in an eye upon which the posterior operation of solution has been properly and efficiently performed. At all events, that degree of injury is usually inflicted upon the crystalline capsule, which absolutely prevents the reproduction of the lens.

Having very briefly explained the structure of the crystalline capsule, its situation and its use, and also pointed out the common characters of the crystalline lens, the strong probability that it is a vascular and organized substance, and that the adaptive power of the eye is, in a great measure, dependent on some change in its figure, I proceed to treat of their diseases.

### SECTION I.—INFLAMMATION OF THE CRYSTALLINE CAPSULE.

Inflammation of the crystalline capsule is not, I believe, usually distinguished by practitioners at an early period of its existence, when alone it is likely to be successfully combatted by remedies.

When treating of the anatomical relations of the crystalline capsule I stated that the proper capsule of the lens possessed a serous surface which was opposed to the lenticular body and which secreted the liquor Morgagni, and that its comparatively thick pupillar hemisphere was connected by its iridal surface with the membrane of the aqueous humor, whilst its posterior or neural portion was conjoined with the hyaloid membrane. Now all these parts may be diseased separately, or conjointly, and there will be, of course, a great difference in respect to symptoms, as one only, or the whole of this series of membranes, may be diseased.

I have stated that inflammation of the crystalline capsule is a rare disease, but Mr. Mackenzie appears to think differently, for he says that, " opacities of the capsule" (which are by no means infrequent) " are probably in all instances the result of inflammation."* I mentioned also that the disease was not generally discriminated by practitioners at an early period of its existence, and it is stated by MR. WARDROP, in confirmation, as I think, of this opinion, that "inflammation of the neural portion of the capsule, and of the proper capsule of the lens, can only be known from its effects in destroying the transparency and delicate structure of these parts."*

---

* *Practical Treatise*, page 474.

Professor WALTHER was the first to distinguish inflammation of the crystalline capsule with any approach to precision, and I am even now unacquainted with any author who has described this disease with so much care, minuteness, and fidelity. It is necessary, however, to make some allowance for the introduction of certain fanciful notions among his really ingenious and able delineation of this interesting and peculiar morbid affection, and also to bear in mind that his descriptions are taken from exceedingly well-marked instances of the disease, and that he was much assisted, as respects the observation of the morbid process, by powerful glasses. I shall quote WALTHER's account of inflammation of the crystalline capsule as it appears in the second volume of the *Quarterly Journal of Foreign Medicine and Surgery.*—"Inflammation of the crystalline capsule usually occurred in men about the middle of life and of a slightly cachectic disposition, and was always preceded by a string of various local affections, which had often commenced with itch, gout, or catarrhal affections. The disease occurs oftener in light eyes than dark, and is always accompanied with a slight change in the colour of the iris and form of the pupil, the first becoming a little darker, and the pupil slightly oval and drawn upwards and inwards to the root of the nose. The motions of the iris are at first more lively and extensive to partial variations of light, but subsequently they become more sluggish. The pupil is habitually smaller than in the sound state, and there usually exists a black ring of irregular breadth all round its edge, produced by a real eversion of the uvea, that is, the pupillary edge of this projects beyond the same edge of the real or anterior membrane of the iris.

---

* *Morbid Anatomy*, page 112.

"Along with these symptoms, a number of red vessels now appear in the pupil itself, the largest of which are visible to the naked eye, which has been accustomed to such investigations, but the greater number are only distinguishable with the aid of a sextuple magnifying glass. What to the first appears merely a red point, assumes, under the glass, the appearance of a most delicate tissue of vessels.

"The red vessels observed in the pupil during inflammation of the capsule always constitute a sort of vascular wreath, situated at about a quarter of a line's distance from the pupillary edge of the iris; this wreath forms a concentric circle with the pupil, and is found on examination to consist, not of a circularly disposed vessel or vessels, but of a number of vascular arches, similar to those formed by the arteries of the palm of the hand and joint of the knee. To this vascular wreath there run in a radiated form as to a common centre, numerous vessels from the periphery of the anterior capsule. Some vessels seem to extend from the pigmentum of the uvea into the capsule, and might lead us to suppose that all the vessels seen in the pupil are merely prolongations of those on the posterior surface of the iris. This however is not the case; sometimes there are no such vessels present; where they are, it is only after the disease has lasted some time that they appear; whilst at other times, vessels are seen prolonged from the capsule into the uvea, reciprocally as those of the latter into the former. Besides, these prolonged vessels are observed to have an oblique direction with respect to the axis of the eye, and they never are the largest trunks, which we see come from the edge or circumference of the capsule. The vessels going between the iris and capsule never arise from the very edge of the former, but at a little distance from it on the posterior surface, so that nearly a line's breadth of the pupillary portion is free from these vascular sproutings.

"From the vascular wreath we have described, vessels are seen spreading towards the centre of the anterior capsule, and there again forming clusters and arches; and although the connection between the vessels seen in different parts of the pupil seems interrupted at some points, yet there is no doubt it holds good universally, although from the extremely minute size of the vessels they cannot be distinguished.

"At the apparent terminations of several of the vessels in the capsule, we distinctly perceive small knotty pieces of a whitish-grey semi-transparent substance, evidently coagulable lymph, the presence of which effusion serves to disclose the manner in which inflammation of the lens and capsule produces opacity of these parts. The anterior capsule, where the vessels are very numerous, sometimes assumes a peculiar velvety flocculent grey or brownish appearance, which has led some to the idea that a flake of the pigmentum of the iris or choroid has been detached and become adherent to the capsule of the lens; but, this is a mistake; we never find that a piece of the pigmentum has been detached, even when the greatest violence has been offered to the eye. The brownish spots on the anterior capsule are in some cases occasioned by the effusion of lymph, and by the extreme terminations of the vessels.

"As to the state of the patient's vision who is affected with inflammation of the capsule of the lens, when the disease is severe, vision is indistinct and confused, particularly when looking at distant objects, whereas those that are nearer are seen, as if through a fine gauze, but without distinguishing therein some threads larger than others corresponding to the vessels. Neither does this gauze seem red, or are objects tinged with that colour."

It will be remarked that where the disease is very severe the lens and capsule become quite opaque, a portion of lymph is effused on the surface of the anterior and posterior hemispheres of the capsule, and that the hyaloid membrane, the posterior capsule, the anterior capsule, a mass of lymph between them, (the lens is sometimes absorbed, and a mass of lymph exists in its stead) and the iris, are all connected by the medium of blood-vessels, which are sometimes so abundant as to tinge the parts of a densely red colour. At the same time the posterior textures may be injured, and the eye, presuming the pupil were cleared of the opaque matter, may still be wholly unfitted for the purposes of vision. Sometimes the capsule may be affected with inflammation which may thicken its texture and render it opaque without leading to any decided organic adhesion to neighbouring parts.* Inflammation of the capsule sometimes leaves behind a state of dropsy of its cavity, and produces the following changes in the eye and in the state of vision:—a very slight arrangement of vessels may be remarked around the edge of the cornea, the iris is convex in front, and nearly in contact with the cornea, its pupillary margin may be discoloured, and perhaps distinctly vascular, there is a very dull green, or whitish-yellow, state of the pupil, which is rather small and quite immovable. The superficial vessels of the eye may or may not be enlarged, and vision is almost totally lost. I have instituted several careful post-mortem examinations of eyes so diseased, and have usually found the capsule thickened, and its anterior hemisphere pressed against the cornea, whilst its cavity has been filled with a turbid greenish or yellowish fluid, the capsule itself being greatly distended. But I know of few diseases which admit of greater variety in their symptoms than the present. For, in the *first* place, it may exist as a sole

---

* Whilst writing this *note* I have before me a preparation of an opaque capsule and lens which I removed from the eye of an elderly Scotchman, (MR. STEVENS) a patient of my friend MR. W. H. PARTRIDGE. This gentleman has been very subject to gout for a long time past, and also to a slight degree of irritation of the eyes, but he has not for many years suffered from any distinct acute inflammation of the eye. I was requested to operate upon his eyes for cataract, and on making the necessary examination of them previously, I discovered, that the iris of the right eye was a little bulged forwards, and that the capsule appeared to be rather thick and of a silvery brightness, but as the pupil was enlarged on the application of belladonna to the eye-brow, as the iris was not discoloured, and as its pupillary margin had acquired no morbid adhesion, and as he could

---

distinguish suddenly contrasted degrees of light, I saw no reason to refuse to perform the operation from any expectation of its failure. I did perform the operation, with the assistance of his usual medical attendant, and on introducing the sharp end of the curette beneath the corneal flap for the purpose of dividing the anterior capsule, I found that it was very much thickened, and, on slightly pressing the eye, the thickened capsule darted through the opening in the cornea very rapidly with the lens and whatever else it contained. On carefully examining the substance I had removed, it was found to consist of the capsule, which was thickened and rendered opaque, and more especially its anterior hemisphere; a considerable quantity of dirty serous fluid and also a firm yellowish-brown lens, about half its usual size. It appeared exactly as though the lens had been partially absorbed by the pressure of the fluid, which had been secreted by the neural surface of the capsule (which had been the seat of chronic inflammation) whilst the capsule itself had been thickened and rendered opaque, by the deposition of lymph within its texture. This, then, would appear to be an example of inflammation of the crystalline capsule merely, more particularly affecting its anterior hemisphere. There was no evidence of the implication of surrounding parts—the iris was not discoloured, there were no adhesions between the thickened capsule and the iris, and vision was remarkably good after the operation, and so continues.

affection, or it may be combined with other more or less serious disease of a greater or lesser number of neighbouring textures; *secondly*, it may affect both hemispheres of the capsule equally, or its anterior or posterior hemisphere more particularly; *thirdly*, it may communicate to the diseased capsule an opaque clear or dirty-white, or a bright or cloudy-yellow or greenish, aspect; *fourthly*, the fluid contained in the capsule will vary in its quantity and its qualities, and in conjunction with the varying condition of the lens as to colour, opacity, and degree of absorption, will communicate a corresponding variable appearance when witnessed through the pupillary aperture. The extent to which the iris may be bulged forward will be mainly influenced by the degree of plenitude of the capsule. I have seen an instance where dropsy of the capsule occurred, from chronic inflammation, so that the lens was partially absorbed, and the capsule itself, after having acquired a convex figure, ruptured, and discharged its contents (consisting of the lens and the inflammatory fluid) into the anterior chamber.

*Causes.*—I cannot say that I have seen this disease sufficiently often to enable me to specify the particular circumstances which usually give rise to it—in fact I know nothing about its causes abstracted from those which give rise to ophthalmic inflammation generally.

*Treatment.*—If the case is seen at an early period it would be right to have recourse to the application of leeches around the eye and to the use of mercury, and, at the same time, to apply the extract of belladonna to the eye-brow and institute some form of counter-irritation; but if we do not see the case until a later stage, we can only adopt the same means, and, as soon as the inflammation has subsided, we may perhaps find the eye in a condition to permit the opaque matters to be extracted by a section of the cornea. I am persuaded we shall not unfrequently succeed in reducing this form of inflammation, if we have prompt recourse to the application of leeches, the administration of mercury, the use of counter-irritation, and direct the patient not to employ the eyes in a bright light or in the inspection of minute, brilliant, or vividly coloured objects. It will be borne in mind that the disease consists of inflammation of a serous membrane, that it proceeds to the effusion of lymph, which has in this situation a peculiar tendency to become organized and united to the surrounding vascular parts. The effect of mercury in arresting inflammatory action, suspending the process of organization, and promoting the absorption of inflammatory products and of feebly and recently organized parts, has been already very fully pointed out, and its utility, in the management of the disease under consideration, will be at once apparent. The application of the extract of belladonna to the eye-brow is useful not only as a means of assisting the proper inspection of the diseased organ, but for the purpose of preventing or of detaching or elongating recently formed adhesions. When inflammation of the capsule appears to be connected with any constitutional malady, such as gout or scrofula, the constitutional treatment of these affections will be added to the local measures.

## SECTION II.—INFLAMMATION OF THE CRYSTALLINE LENS.

It has been said that the lens is sometimes the seat of inflammation—that inflammation may occur and may be regularly and distinctly developed in the substance of the lens, and Professor WALTHER states, that " inflammation of the lens, as that of the bones, cartilages, and fibrous textures, always observes a chronic course. It proceeds very slowly, and is accompanied with little pain—nay, in some cases, none whatever; and when pain is present, it is not seated in the part itself but at the bottom of the orbit, over the forehead, or in the crown. When the disease has lasted some time, the blood-vessels in the lens and capsule become varicose, and remain stationary so." He further says that, "the various kinds of cataract correspond with the different terminations of inflammation:—thus, the firm hard cataract is induration of the lens; the fluid cataract, where the capsule contains a milky or puriform fluid, seems to correspond with suppuration in the parts; and in the *cataracta arida siliquata* the lens is in the state of dry gangrene." He also says, (and here his views are strangely visionary) that "induration of the lens may also take place without inflammation, and then it seems more of a scirrhus nature, indeed it is well known that cataract often occurs at the period of life, and under circumstances which appear to favour the occurrence of scirrhus in other parts of the body. Purulent cataract may sometimes also be the effect of ulceration of the lens."* Now, it is certainly rather surprising that WALTHER, who, like PETIT and PORTERFIELD, believed the lens to be nourished by a process of imbibition—by absorbing the liquor Morgagni—should have made such fanciful and erroneous statements. I am quite unacquainted with any disease of the eye than can with propriety be designated lentitis, although I have repeatedly seen a mass of lymph deposited within the capsule in consequence of inflammation of that part, and subsequently become the seat, the nidus as it were, of a large number of vessels—it has formed the substance or texture in which they have become developed—so that the lymphatic mass resembled, from its intensity of organization, a quantity of red lymph, such as may be seen in a severe case of syphilitic iritis. We ought not, of course, to confound the organization of a mass of lymph contained within the capsule, or the union and inosculation, in such lymph, of the vessels which proceed from the two hemispheres of the capsule, with inflammation of the true lenticular substance, which, I believe, never occurs, at least, the enlargement of the vessels of the lens to an extent adequate to admit red blood, which may be detected either by the naked eye or by means of a magnifier, never takes place whilst the true and original lenticular texture, unmixed with any lymphatic deposition, remains. As, therefore, I do not admit the existence of lentitis, properly so called, of course, I have nothing to say respecting its treatment.*

---

* The opinions of WALTHER upon this subject have been implicitly adopted by VETCH, (*Practical Treatise*, p. 110) who speaks of three varieties of *lentitis*—namely, the *adhesive*, the *suppurative*, and the *ulcerative*. Whilst the real nature of the structure of the lens is doubtful in the estimation of those who (by making it the subject of careful dissections and attentive scrutiny) have attempted to obtain their information respecting it by the most legitimate means, it appears quite preposterous to speak of its diseases as though they were not merely analagous to, but precisely the same as, those occurring in the purest type of the most important and distinctly characterized tissues which enter into the composition of the human body.

---

* WELLER speaks of two forms of *lentitis*—namely, the *pure* and the *impure*. He says it is important "above all things" that medical men should become acquainted with the symptoms of this disease, because "a very great number of cataracts arise from an inflammation of the lens and of its capsule." MONTEATH's translation, p. 245.

## SECTION III.—DISLOCATION OF THE CRYSTALLINE LENS.

Syn. *Cataracta luxata.* SAUVAGES.—*Cataracte déplacée.*
MAÎTRE-JAN.—ST. YVES.

The crystalline lens is liable to become displaced from a great variety of causes, and to occasion, *per se*, a certain amount of irritation, which amount of irritation will, for the most part, be determined by the position of the dislocated lens, its magnitude, its consistence, and its situation, and also by the nature of the cause producing it, the state of the eye previously, and the local and general susceptibility of the individual in whom it takes place.

*Its situation.*—By accidental violence the lens may be pushed directly backwards, upwards, or downwards, or to either side; it may be sustained on the pupillary margin of the iris; it may be forced into the anterior chamber; it may be urged against the iris, and may compress that delicate membrane against the neural surface of the cornea; or it may rupture the sclerotica, and pass through the opening, and be situated between the sclerotica and the conjunctiva. If it be urged into any one of these situations by accidental violence, the eye being previously healthy, the symptoms will be more or less severe in accordance with the extent of the injury from which its displacement arose, and the other circumstances just mentioned. If the eye be in a state of chronic inflammation prior to the infliction of this new injury, the symptoms will be additionally severe and obstinate. If it take place from disease of its capsule, the symptoms will also be extremely severe. Again, the crystalline lens may be displaced from a spasmodic action of the muscles of the globe, from violent straining, as in lifting heavy weights and during the act of vomiting; in this case also the symptoms produced are very severe.

When the lens is displaced it usually becomes opaque very soon afterwards, but when its capsule is at the same time detached so as to cover it and shield it from the action of the aqueous humor, this occurrence (opacity) takes place much more slowly, and although in every instance but one which has fallen under my own observation, the displaced lens, enveloped in its capsule, has not retained its perfect transparency, at least for any long period after the displacement has occurred, yet such instances are mentioned, and have been witnessed and described by competent observers. Two such cases are recorded by Professor CHELIUS, and in both of them the prolapsus of the lens occurred spontaneously; the lens became gradually opaque, however, in the course of a few weeks. A somewhat similar example is related by DR. WARREN.

A displaced lens of a bright yellowish or brown colour may resemble, in its appearance and in some of the symptoms to which it may give rise, malignant disease of the eye—fungus hæmatodes for instance—(such a case is mentioned by MR. CADENHEAD in the *Lancet* for August, 1829) but I apprehend that an attentive examination and careful inquiry into the history of the case, will always be adequate to remove any doubts, which might previously have existed, respecting the true nature of the disease.

If the lens be forced directly backwards it will be observed as soon as it becomes opaque, but cannot always be readily and certainly distinguished before; if it be pushed upwards or downwards or to either side, a portion of its margin will generally be seen through the pupil; if it be merely dislocated into the posterior chamber so as to bulge the iris forward—towards the cornea—that circumstance alone will be sufficiently characteristic of the nature of the accident; if it be sustained on the floating margin of the iris, or propelled into the anterior chamber, the presence of the lens in its new locality will render the nature of the mischief palpably evident; and if the lens has passed through the sclerotica, and elevates the conjunctiva, the nature of the injury is sufficiently manifest.*

When the lens is pushed into the substance of the vitreous humor by a force which does not at the same time inflict much injury upon other parts of the eye, the consequent ophthalmia is not usually severe, but if it be urged directly upwards or downwards or to either side, the patient's vision may be completely destroyed by the pressure of the hard margin of the lens upon the retina, just as would occur if, in performing the operation of depression, the lens were too much depressed; at the same time the patient will very likely suffer from great pain and sickness, with convulsive spasms of the muscles of the eye and the face. Again, the lens may be displaced into the posterior chamber without being urged into the vitreous humor, or it may be sustained on the floating margin of the iris, or it may be propelled into the anterior chamber, and in all these cases the iris will be very liable to suffer most severely, because the injury which effects the dislocation very often gives rise to an inflammatory state of the eye, which is, of course, very likely to be increased by the presence and the pressure of a large firm foreign body, for such the displaced lens must be considered. In the former of these cases the iris is pushed towards the cornea, and the irritable state of the muscles of the globe occasionally urges the lens forward so as to force the iris into immediate and compressive contact with that tunic; in the second of these three forms of dislocation, the iris is compressed by the edge of the lens, the circularity of the pupil is destroyed, and it is elongated in that direction where the lens is fixed and supported by the pupillary border of the iris; and in the last of these varieties of displacement, the iris is pushed backwards by the lens, which its loose border supports and retains in the anterior chamber.

---

* I had been in practice three or four years before I had an opportunity of seeing this variety of dislocation of the lens; I have now seen five such cases and treated four of them. The first of these examples of this very unusual form of disease, is thus entered in my *case-book*—"GEORGE FREE received a severe blow upon the left eye, which was immediately followed by severe pain, and by the formation of a swelling just behind the margin of the cornea. In a few days afterwards he called upon me; when the following appearances were observed. The iris was drawn towards the tumour at the edge of the cornea, so that it appeared as though absorbed at that point; the eye was inflamed, but yet the pupil appeared to be unusually clear. The cornea was not shrunk and flattened, neither did the iris vacillate. The tumour was placed immediately behind the edge of the cornea towards the inner canthus; it was of a convex figure, of considerable size, and of a yellowish colour, so that it resembled a collection of thick yellow pus or consistent jelly, placed beneath the conjunctiva.

I pointed out the nature of the accident to the students attending at the Infirmary; and at once proceeded to divide the conjunctive membrane with BEER's knife, and when I had done so, a moderately firm lens escaped. The eye was afterwards kept cool by means of goulard water—a trivial amount of ptyalism was produced by the administration of calomel and Dover's powder—and eventually a slight degree of sight was restored."

The symptoms attendant on all these forms of dislocation may be more or less severe, depending, as I before remarked, on the nature of the injury producing the displacement; the local and general susceptibility of the individual in whom it occurs; the state of the eye previously; and the size, consistence, and situation of the lens itself. But when severe symptoms do occur they consist, in the general, of ophthalmitis, great frontal pain and hemicrania, and a ceaseless agony in the eye-ball. The displacement of the lens arising from disease of its capsule almost always takes place either into the anterior or posterior chambers, and may be associated or otherwise with severe inflammation. The suddenness with which its capsule is ruptured, and the force with which the lens is projected on leaving it, determine, or at least mainly influence, the degree of resulting inflammation. Sometimes the lens will become displaced and will move under the influence of gravity from one chamber of the eye into the other, and will occasion no pain or inflammation. Such a case is related in the little work of DR. BOWEN on *Hyalonyxis.* DR. WARREN has detailed a like example of disease, and I shall presently mention an instance of a somwhat similar nature.

*Treatment.*—When the symptoms produced by the displacement of the lens are not very severe, an attempt should be made to moderate them by venesection, the use of blisters, and the administration of mercury, as the circumstances of the case may require.* If it take place before the middle period of life the lens is very likely to become absorbed (unless indeed it be enclosed within its capsule) and the measures calculated to promote its absorption should, of course, be employed; venesection, the administration of mercury to the production of slight ptyalism, the application of belladonna to maintain the dilatation of the pupil, and the employment of counter-irritation, will, under these circumstances, be particularly useful; and even if we cannot obtain the absorption of the lens, it is by no means improbable that we may be able to remove the irritability of the eye so as to place it in a favourable state for the performance of the requisite operation. When the symptoms are exceedingly severe and are not controllable by the ordinary means employed for the subduction of acute inflammation, the lens being hard and large, it would be better to make a section of the cornea (passing the knife behind the lens if it be in the anterior chamber) and remove it at once, for it is probable that the pain and inflammation are in a great measure dependent on the pressure and irritation produced by the presence of the displaced lens, and that the inflammation and pain will be materially relieved by its removal. In nearly every case of this description the lens is either very hard and large, or enveloped by its entire capsule. We must be careful to distinguish the inflammation produced by the presence of the lens from that excited by the original injury, of which injury the dislocation of the crystalline is merely a part. The early removal of the displaced lens by an operation has been recently represented as a modern improvement in ophthalmic surgery, but this is an error which could only arise from an imperfect acquaintance with the writings of former authors.*

---

* I have already stated that the lens may be displaced in front of the iris without exciting much uneasiness, so that it would be most improper to determine beforehand that acute inflammation must necessarily follow this changed locality of the crystalline, and demand its removal by a surgical operation. MR. LUCAS mentions a case in which whilst operating for cataract upon a person seventy-five years old "the opaque lens accidentally slipped into the anterior chamber, where it gradually dissolved, and required no further operation." (*Medical Observations and Inquiries.* Vol. vi. page 259.

---

* There is a good account of the symptoms produced by, and of the various circumstances connected with, dislocation of the lens, in the thirty-sixth volume of the *London Medical and Physical Journal*, from the pen of DR. WARREN, he appears to think that it is not only necessary to remove the displaced lens by an operation, when it has *already produced* acute inflammation of the eye, but that it is also justifiable to extract the lens, immediately after its displacement, as a means of *preventing the occurrence* of severe inflammation. I apprehend we cannot lay down any positive rule upon the subject—our conduct must be determined by circumstances.—The reader may further consult, upon the treatment of dislocation of the lens, the opinions of BARTON, MACKENZIE, and HUNT, as contained in the fifth

To the preceding history of dislocation of the lens I shall add the following passage, taken from the published *Lectures* of Baron Dupuytren:—"The opaque crystalline lens may be displaced by a blow on the eye or head, and escape into the anterior chamber, or become impacted in the pupil. This has been observed during the operation of depression, and it is right to mention that some persons possess a power of pushing, at will, the lens from one chamber to the other. The most remarkable examples of this last power are contained in Demour's *Traité des maladies des yeux*, of which the history may be briefly given:—'I have sometimes observed the opaque crystalline lens pass through the pupil into the anterior chamber and return to its original situation. Some patients could execute at will this alternate displacement. M. M. Tillard and Bushnel were with me on the 3rd July, 1817, when M. Gastel, who was affected with cataract, passed the lens in their presence into the anterior chamber, and afterwards behind the iris. He was thirty-two years of age, of a good constitution; the right cataract was dated from the age of six years, and had descended by little and little behind the iris; about puberty it was invisible for eighteen years, and was plunged in the vitreous humor. It passed through the pupil during his military duties, and caused such continued pain that he was discharged from the service. I pro-

---

and ninth volumes of the *Medical Gazette.*—In a foot note to Daviel's memoir "sur une nouvelle méthode de guérir la cataracte par l'extraction du crystallin" (*Mémoires de l'academie royale de chirurgie.* Tom. xi. p. 339) the ingenious author mentions that "M. Petit, a pratiqué, en 1708, la section de la cornée pour extraire le crystallin qui étoit passé dans la chambre anteriéure." The plan advised by Dupuytren under similar circumstances consists in passing a needle behind the margin of the cornea into the anterior chamber, fixing it firmly in the substance of the lens, and hooking it behind the iris.

posed extraction, but he declined the operation; I advised him to instil some drops of the aqueous solution of the extract of belladonna into the eye to dilate the pupil, and to facilitate the return of the lens behind the iris ; and in order to favour this passage he was to lie on his back for twenty-four hours, the head being so that the summit is lower than the neck ; and finally, to instil some drops of vinegar into the eye to excite slight inflammation, so as to close the pupil and render it smaller than before the use of the belladonna, a proceeding which I have employed in certain cases with success. He remained eight years and a half free from any return of his complaint, which returned in two years afterwards every three or four months. If he depresses his head suddenly, the lens passess into the anterior chamber, and he replaces it by lying on the ground, his chin elevated, the crown of the head depressed, and rubbing the superior lid with the finger. I will probably extract it some day.' "

I shall now give, from my *case-book*, an instance (the only one I have ever met with) in which the dislocated lens preserved its perfect transparency. The case is well known in Birmingham, for I took care that every medical gentleman, who desired to do so, should have an opportunity of seeing it.

*Case.*—A man who had some years previously lost the sight of his right eye, discovered a considerable confusion of vision in the left, which came on without any assignable cause, and soon increased so much as to render him unfit to follow his employment. At this period he applied to MR. SMITH,* of Southam, for relief. On an examination of this recently affected organ, it was found that the lens had become dislocated, and floated about sometimes in the posterior and at others in the anterior chamber, the patient remarked on this point that when he stooped forward the lens projected, that is, it fell into the anterior chamber and pressed back the iris producing slight uneasiness; it was, in fact, quite under the influence of gravity; it was also seen that the crystalline humor preserved its figure, magnitude and transparency, and it was said by one gentleman who examined the case, to resemble a drop of clear oil floating on water. In this condition he came to the infirmary, three months after he had first discovered the malady; he had then no useful degree of vision, although his sight varied much, and chiefly in accordance with the position of the lens. As there was no inflammation present, as the displaced lens excited no irritation, and as the eye was considered to be affected with incipient amaurosis,* my colleagues thought, and I was of the same opinion, that it would be quite wrong and unnecessary to extract the crystalline body.†

---

* I am greatly indebted to this celebrated surgeon for furnishing me with repeated opportunities of witnessing many interesting and anomalous forms of ophthalmic disease, and I take this public opportunity of expressing to him my acknowledgment of many acts of professional kindness and attention.

---

* I am now referring to a defect of sight unconnected with the mere pressure of the lens upon the retina, as occurs when the displaced crystalline may have passed behind the iris. When dimness of vision is associated with a displaced lens, which is moveable with the varying positions of the head, it is desirable to discover if this defect be owing to the pressure of the lens upon the retina, to the concussion of the eye which caused its displacement, or to the irritation occasioned by its mobility.

† I have already published my opinions upon this variety of dislocation of the lens. (See *Transactions of the Provincial Medical and Surgical Association*, Vol. ii.)

## SECTION IV.—OSSIFICATION OF THE CRYSTALLINE LENS AND ITS CAPSULE.

The crystalline lens and its capsule may be converted into an ossific mass; and this singular change generally takes place in gouty or rheumatic individuals who have been much subject to inflammatory affections of the eye, or otherwise it results from a blow upon the eye or other local injury; in some instances its cause cannot be satisfactorily ascertained. When the capsule becomes ossified it is changed (I give the general rule) into a thin, smooth, delicate lamina of bone, and preserves its ordinary shape, occupying either the space of the entire of its original structure, or being confined to one or more specks of ossific deposition; but when the lens becomes ossified it is generally small in size, altered in figure and more or less rugged. Sometimes it produces great irritation, and this is more likely to occur where the lens is large, the ossification complete, and its surface craggy and uneven. If a lens so circumstanced be examined it will be found that the inequality of its surface appears to depend on the absorption of the soft parts of the lens during the progress of ossification—this will sufficiently account for the irregularity of the ossification; the ossification being complete at those points where the lens retains the outline of its former magnitude, but, on the contrary, being incomplete where the interstices exist. This is generally the case where extensive ossification of the lens takes place, but where only a very slight amount of ossific matter occurs, it may exist at any part of the lens, but is more usually found in its centre, in combination with the lenticular substance.

The treatment of such a case resolves itself into the removal of the bony substance whenever it excites a sufficient degree of irritation to render that removal necessary, and, of course, this is effected by a section of the cornea sufficiently ample to permit the extraction of the ossified body. The after-treatment consists in the adoption of measures for promoting the union of the corneal flap, for preventing inflammation, or, if it exist, the employment of means for its subduction. When ossification of the lens and its capsule are accompanied by important changes in other textures of the eye the integrity of which is essential to perfect vision, the removal of a source of pain and irritation, and the preservation of the opposite organ, are the immediate objects contemplated in the removal of the ossified body by an operation. I have known many cases where ossification of the lens and its capsule was, at first, productive of great pain, but as the eye became gradually disorganized, the pain has subsided, and the ossified body has remained, but I do not recommend that persons be allowed to suffer the unnecessary torture so generally connected with the continuance of an ossified body in the eye, if they can be persuaded to allow of its removal.

In the course of my practice I have removed, by a surgical operation, the ossified lens and its capsule on ten occasions, so that it may be imagined the disease is not particularly infrequent, especially when it is considered that in some cases where distinct indications of the ossification of the one or other of these parts has existed, no operation has, for various reasons, been performed.

It is stated by MR. COOPER, that "there are instances of the lens having been converted into *cartilage* and bone." "I recollect," says DR. WARREN, "to have dissected a decayed eye, in a subject examined for another purpose, in the cavity of which was found nothing but a little watery fluid and a stony crystalline lens." RICHTER states that "the lens is sometimes as hard as a stone or piece of bone." **Wenzel** relates the case of a young woman upon whom he operated for cataract and he says, "I found the forepart of the capsule not only opaque, but as hard as bone, and brittle. No instrument could puncture it; and at length the capsule came out of the eye entire, with the cataract contained within it." **Mr. Wardrop** relates an instance in which the centre only of the lens was converted into bone, its external laminæ being soft, and their consistence increasing as they approached its centre which was converted into "hard bone." **Mr. Wardrop** says that in every instance he has had an opportunity of examining where the lens was supposed to be ossified, it was contained in an osseous shell, which he concludes was the ossified capsule. **Mr. Gibson**, of Manchester, remarks, in his excellent little work *on the extraction of soft cataracts, &c.* "I have met with one kind (of membranous cataract) partially ossified; so that it felt gritty to the couching needle, and produced a noise, as if the instrument passed over a piece of dry parchment;"* and he subsequently states that in two other instances a portion of the opaque capsule was, when extracted, "found to resemble cartilage in its consistence." This cartilaginous thickening and induration of the capsule has likewise been mentioned by **Beer** and **Lawrence**. Cases of ossification of the lens or of its capsule (which occurs much more frequently than ossification of the lenticular substance) are also recorded by **Morgagni**, **St. Yves**, **Maître-Jan**, **Heister**, **Ronnow**, **Janin**, **Gendron**, and **Morand**.

---

* The same thing appears to have happened to **Delpech**, for, in the course of his remarks on cataract, he says, "dans le cas d'ossification de la membrane cristalloïde, il serait imprudent de pratiquer le déplacement du cristallin." *Dictionaire des sciences médicales*, Tom. iv.

I do not know that the lens has ever been absent from birth, the other parts of the eye being properly developed; of course, whenever the lens is present it is invariably covered by its appropriate capsule. Two lenses are occasionally found in the same eye, and then (presuming both of them to be perfect) each lens possesses a separate capsule; where two lenses *appear* to exist in the same capsule, the appearance is produced either by absorption or by irregularity of development. The lens does not always possess its due relative correspondence, as regards magnitude, to that of the other parts of the eye-ball—it may be smaller or larger than it ought to be relatively to the size of the eye-ball.

# CHAPTER XIV.

## CATARACT.

### SECTION I.—DEFINITION OF, AND GENERAL OBSERVATIONS ON, CATARACT.*

*Definition.*—By the term *cataract* is usually understood an imperfection or loss of vision dependent on an opacity of either the crystalline lens or its capsule or of both. However, this definition is not critically correct, for, when an opaque state of the lens is combined with, or superadded to, glaucoma or amaurosis, we still term the opacity of the lens and its capsule " a cataract," although the dimness or loss of vision is adequately explained solely by a reference to the diseased condition of the vitreous humor, the retina or the choroid.

*General observations on cataract.*—I have already explained that genuine cataract is defined to be an imperfection of vision dependent on an opacity either of the crystalline lens or of its capsule, remarking, however, at the same time, that if the crystalline lens or its capsule become opaque after vision has been lost in consequence of an affection of the retina or from other disease of the posterior tunics, the opacity of the lens or of its capsule is still said to constitute "a cataract;" this is the compound or complicated cataract of which we shall presently speak more fully.

---

* DAVIEL's interesting account of his mode of extraction is prefaced by the following expression of regret that the management of diseases of the eye should be so generally monopolized by empirics :—" On ne sera pas étonné de ce que les maladies des yeux, et principalement la cataracte, ont été si peux étudiées et traitées avec si peu de succès, si on fait réflexion que, par une sorte de fatalité attachée à la chirurgie des yeux, elle a été, pour ainsi dire, abandonnée aux empiriques. *(Mém. de l'académie royale de chirurgie.* Tom. ii. p. 337.) The circumstance of which DAVIEL complained still exists, and is regretted by MR. LAWRENCE *(A treatise on the diseases of the eye*, p. 3.*)* in common with many modern writers on ophthalmology. The quackery practised by oculists was exposed by BANISTER more than two centuries ago in "a fine strain of indignant poesy ;" it continues, however, and appears as likely to flourish as ever.

The class of cataracts included in the foregoing definition are termed genuine, in contradistinction to another form of the disease termed spurious, and which consists of some adventitious substance placed between the corneal surface of the anterior capsule and the neural aspect of the cornea.

I do not approve of this division of cataracts into the genuine and spurious kinds; first, because it has a tendency to confuse and complicate this already sufficiently extensive and intricate subject; and secondly, because it appears to be scarcely consistent to class the products or effects of inflammation among the varieties of a disease to which it has scarcely any real analogy. If inflammation of the iris producing lymphatic deposition and changing its colour, took place, this discolouration, in consequence of lymphatic deposition within its texture, would not be termed *cataract*; but if, from the same cause, the effusion of lymph occurred in a different situation, for instance, within the pupil and upon the anterior capsule, then, acccording to BEER's arrangement, this effect of the inflammation would be classed among the varieties of false cataract. I object, therefore, to class the effects of inflammation of the iris and of the membrane of the aqueous humor, among the varieties of cataract, and should have preferred to treat of those cataracts usually termed, the *purulent*, the *lymphatic*, the *sanguineous*, the *pigmentous*, and so on, under the head of, *effects of inflammation of the cornea*, *of the chambers of the eye, or of the iris, or consequences of the various forms of operation performed for the cure of cataract*, if custom had not, to a certain extent, obliged me to arrange and treat of them under the more familiar term of *cataract*.

I do not know that we have recently made any very material additions to our stock of knowledge in reference to the general history of cataract; it will be perceived that many parts of this subject were very well understood a century ago by HEISTER, and that he has written a very elaborate article upon it in his *Institutiones Chirurgicæ*. The chief improvements in relation to cataract since his time have been in a great measure confined to not very important matters of detail, with the exception of certain modifications in the respective operations performed for its removal or cure. I shall quote HEISTER's definition of cataract in corroboration of my statement respecting the degree of knowledge possessed at the period to which I have referred, on the subject of this malady. " Et cataractam quidem vel suffusionem quando nominamus istud oculorum vitium cum plerisque scriptoribus designamus, quo pupilla, quæ naturaliter nigra esse debet, amisso colore naturali; opaca sit, et vel in ea, vel mox post illam colores alienos, album puta, cinereum, flavum, cœruleum aut ferrugineum contrahit; unde initio varia visionis impedimenta, tandem vero plena occœcatio sive cœcitas producuntur." (P. 2, Sec. 2, Cap. 55.) It will be found that he was well acquainted with the varieties of cataract as indicated by their colour (See quotation); that he was apprised of the liability to confound cataract with other diseases, as may be collected from his remarks on diagnosis; and that he had paid great attention to other circumstances connected with its history; for he particularly mentions the recent and inveterate, the incipient and confirmed, the mature and immature, the simple and compound, the fixed and shaking, and the true and false varieties of cataract.

A cataract is termed *incipient* when it has made little progress, and scarcely at all impairs vision;—*confirmed*, when it is fully developed and has nearly destroyed the patient's capacity to distinguish light;—*mature* or *immature*, as it may be either in a commencing or a developed state;—*simple*, when unassociated with other disease of the eye, and *compound*, when combined with some other affection of that organ.

The consistence of cataracts varies, and these variations are expressed by the terms, fluid, milky, soft, caseous, and hard.

The colour of cataracts also varies; they may be white, gray, green, amber-coloured, and, it is said, they may be black; they may also be marbled, stellated, dotted, radiated; and lastly, the opacity may be more or less general, it may occupy the whole or a part only of the lens or of its capsule, and will therefore receive, in different instances, an appellation descriptive of its form and extent. With this brief enumeration of a few of the more common terms usually employed by writers on cataract to explain the degree of development and some of the characters and combinations of the disease, I proceed to speak of its causes.

## SECTION II.—CAUSES OF CATARACT.

Professor Walther does not believe that the crystalline lens is nourished by blood-vessels, but asserts that it derives its nutriment by a process of imbibition; however, he declares that it may be the seat of inflammation, that vessels may form in its substance under such circumstances, and that it may be thereby rendered opaque. We know very well that cataract may be occasioned by internal inflammation of the eye, this fact is indisputable, but I do not know that we are in possession of any sufficient evidence to prove that the lens itself ever becomes the seat of inflammation; its vessels are too minute, its organization too feeble, to permit the occurrence of any process which can with propriety be termed *inflammation*. When the eye-ball is generally inflamed (ophthalmitis), or when one or more of its deep-seated textures are the seat of inflammation, the circulation of the lens may be so deranged, its sources of irritation so impaired or perverted, that its death, or, what is perhaps the same, its opacity takes place independently of any positive participation in the inflammatory condition of surrounding parts. The probable accuracy of this view of the subject is strengthened by the occurrence of cataract after local injury; for instance, a person receives a blow upon the eye, or the cornea and crystalline are punctured by a fine instrument, and the latter part becomes opaque, in consequence, without any visible inflammation—any symptoms which we recognize as belonging to inflammation—of the lens itself. The slightest puncture of the lens is sufficient to render it opaque.* It has been thought that various kinds of employment predispose to the formation of cataract—that persons who employ the eyes excessively in reading or writing, or who much expose them to the glare and heat of the fire, are very liable to become the subjects of cataract, but the exceptions to this rule are certainly very numerous. Besides the employments to which I have just referred are much more likely to produce glaucoma or amaurosis, a varicose enlargement of the vessels of the eye generally, or some form of chronic inflammation of the deep-seated textures. Cataract sometimes exists as a congenital disease, and this occurrence has been usually said to be owing to a vice of formation—to some defect in the formative process of the lens—and on the examination of such eyes we certainly cannot find any indication that the defect has taken place from a morbid process; the eyes are in other respects natural, after the performance of an operation the patient generally sees very well (unless it be too long delayed), the lens is usually of its proper figure, the iris natural in colour and appearance, and it is clear that the cataract has not been produced by a general inflammatory state of the eye. It may happen that other defects of formation may exist in the same individual, I have repeatedly noticed various errors of development in children who have been born with cataracts. I shall have occasion to explain the injury to vision, the injury to the development of the eye and to various parts of that organ and its appendages, induced by the continuance of cataract which may have existed from birth.

---

* On a careful perusal of WALTHER's remarks on *lentitis* we find it stated that opacity of the crystalline body takes place after its inflammation, just as opacity of other transparent textures results from a similar morbid process. It is assumed by this indefatigable inquirer that *opacity* is in fact *death* of the lens, so that it is quite evident that there exists very little analogy between this result of inflammation as occurring in the crystalline lens and in other transparent structures. And when, in the same volume, WALTHER declares that, "cataract is originally a natural state of the lens, which subsequently becomes clear

---

and transparent by continued progressive development," he appears to forget that after the removal of the lens in animals, the new matter which is secreted, and which eventually constitutes the regenerated crystalline, is perfectly transparent, and that, partly in consequence of this quality, it is proved to be not the remnant or debris of the old lens, but an entirely new production.

Cataract is sometimes hereditary;* we occasionally observe that several children in the same family are born with cataracts, the eyes being in other respects quite healthy, for such children will see just as well after an operation as persons do when cataract arising from other causes, has been removed; indeed the average rate of success after operations performed upon children for the cure of cataract is much greater than after the same operations performed upon the adult or the aged. I have seen four children in one family with congenital cataract in each eye, the second and sixth child had very healthy and perfect eyes, but the other four (the family consisted of six children) had a well-formed cataract in each eye, and were all of them restored to sight by the performance of the posterior operation of solution. The occurrence of congenital cataract in some families as an hereditary disease is so satisfactorily made out that I will not occupy time by the unnecessary recital of the various arguments and cases bearing upon this subject. It is also a curious and well-ascertained fact, that many of the members of some families are affected with cataract at some period or other of their lives. I cannot say what is the immediate cause of cataract, I cannot explain that process by the direct agency of which the substance of the lens is changed from a beautifully pellucid and transparent body to one of a dull and densely opaque character.

To condense my remarks on the various causes of cataract:—it may occur as a congenital disease, or as the result of hereditary predisposition;—it may take place from puncture, laceration or penetration of the lenticular or capsular substance;—from displacement of the lens, or from concussion of the eye or head independently of displacement of the lens;—from the mere contact of the aqueous humor with its surface;—from inflammation of the capsule or a general acute inflammatory state of the eye;—and lastly, it may arise, as I believe, from a mere defect of nutrition, of which the common senile cataract is an illustration. The lens of old persons in whom cataract eventually takes place becomes gradually opaque at its centre; by degrees its circumference is first rendered slightly turbid and ultimately thoroughly opaque, until indeed cataract is fully formed. The vessels of the lens are most minute at its centre, its circulation is most languid there, and it is there where the lens first perishes in very old persons; and this leads me to the consideration of the following question which perhaps cannot be more conveniently discussed at any other part of my observations; namely, is the dull and opaque state of the lens which we designate *cataract*, actually death of the lens, as DELPECH, DEMOURS, WENDT, and WALTHER have stated? Parts may be discoloured and may still retain their usual degree of vitality and their proper grade of organization; for instance, a serous membrane may be rendered opaque, or the colour of the iris may be changed, by inflammation, and yet we do not say that either the one or the other of these textures has lost its vitality when merely so altered, but I suspect that when the crystalline lens has become opaque it ceases to be a living part of the animal machine. The occurrence of cataract in very aged persons, and of congenital cataract, the hereditary predisposition to cataract in some families, and the proneness of the lens to become opaque from slight injury, strongly dispose me to this opinion. If common senile cataract be not caused by the death of the lens, if this explanation of its opacity be rejected, we are totally at a loss to explain its frequent occurrence in aged persons; it is evidently not produced in them by inflammation, for it takes place first—it is first perceived—in the centre of the lens, it occurs in old feeble persons, and is unattended by pain or by any morbid effects in other parts of the eye which can with propriety be referred to an inflammatory cause.

---

* The hereditary character of cataract has been remarked by JANIN, WOOLHOUSE, MAÎTRE-JAN, RICHTER, BEER, LUCAS, SAUNDERS, DUPUYTREN, ADAMS, PORTAL, WARDROP, and BOWEN.

*Hereditary predisposition.*—Certain peculiarities in the physical characters and the anatomical construction of members of the same family very frequently take place; certain defects of formation and singularities of organization corresponding to those of their parents, occur sometimes in children, and we say, in all such instances, this peculiarity of form, this description of organization, and so on, is an hereditary defect or quality. The child of an Albino possesses very generally the complexion of its parent, the same texture of skin, the same colour of hair, and the same paucity or absence of the uvea and pigmentum nigrum, and we term these peculiarities of organization, hereditary qualities. Now I imagine that we are equally justified in representing any feebleness in the organization of any particular part which we may have observed to occur with frequency and something like regularity in the various members of a family at a certain period of their life, an hereditary defect or quality, and this is exactly what I believe takes place in reference to the organization of the lens in the respective branches of some families. This feebleness or debility in the organization of the crystalline lens in such individuals by which they too frequently become the subjects of cataract at a certain age, is also favourable to the views I have taken of the actual pathological state of the lens when rendered opaque.

*Cataract from slight local injury.*—The lens, as I have already stated, is a very feebly organized substance, and is, therefore, remarkably prone to perish from an exceedingly trivial amount of local injury. When merely penetrated, in its healthy state, by a fine needle, it usually becomes opaque* to a greater or lesser extent, and apparently from an incapacity to sustain the slightest injury without undergoing partial or total death. This change evidently occurs quite unconnected with inflammation, no reaction takes place, but its vitality gradually declines until its whole texture eventually perishes. These effects of local injury upon feebly organized parts are, however, by no means peculiar to the lens.

## SECTION III.—DIAGNOSIS.

Glaucoma or amaurosis may be mistaken for cataract, and cataract may be combined either with glaucoma or amaurosis, and it is most desirable that if such combination exist it should be detected, inasmuch as it would materially influence the character of the prognosis and also the treatment.

1. *Situation of the opacity.*—The opacity produced by lenticular cataract is placed just behind the pupil, and commences in the centre of the lens, but glaucoma is

---

* The opinion I have expressed in the *text* is in strict conformity with that of surgeons generally, and it has been derived, on my own part, from a pretty extensive field of observation, and also from experiments performed upon animals. However, I do not think that a very slight wound of the lens with a fine sharp instrument so generally destroys the transparency of the lens in rabbits and dogs as in the human subject. I mention this fact in consequence of having perused the statements of Dr. Dieterich on wounds of the lens and its capsule. He found that it was rather difficult to render the capsule of the lens opaque by merely wounding it, and that the lens itself would bear a good deal of injury with a sharp instrument without becoming opaque. A good account of his experiments may be found in the twenty-fifth volume of the *Edin. Med. and Surg. Journal*, but I may remark, that his conclusions have not been verified by succeeding experimentalists.

more deeply seated, it is situated quite at the back part of the eye, and may be generally seen on a *lateral*, though not so clearly distinguished as on a *front*, view of the globe.

2. *Colour of the opacity.*—The opacity constituting cataract is generally of a white or a bluish-white, a gray or an amber colour, but that of glaucoma has generally a dull dingy-green or dirty-yellow appearance.

3. *Surface of the opacity.*—The surface of a lenticular cataract is convex—and this convexity, and also a tolerably correct idea of its rather circumscribed extent, may be generally distinguished by a careful examination—whilst a glaucomatous opacity has a cupped appearance and is much more extensively diffused.

4. *State of vision.*—In simple cataract the patient's vision varies with the degree and extent of opacity; if that be great, vision will be exceedingly indistinct, but if the opacity of the lens be slight, the dimness of vision will be slight also; and besides his sight will be more defective during the bright light of mid-day than in the dusky light of approaching evening. In glaucoma the dimness of vision will bear no exact correspondence with the visible amount of dulness or opacity; sight may be nearly destroyed although the pupil may be merely slightly dull and cloudy, and vision is usually least imperfect during the bright light of day.

5. *State of the eye-ball.*—The globe will be perfectly natural in form, in size, and in its degree of firmness, in simple cataract; but in acute glaucoma it will be more tense and harder than it ought to be, and this is a very important means of distinction between these two affections. Glaucoma is often attended with pain and uneasiness in the eye-ball, but simple cataract does not give rise to the slightest suffering. And further, a glaucomatous

eye has a peculiarly unhealthy appearance—the sclerotica may acquire a bluish tinge, and some of the superficial vessels may become varicose.

6. *Activity of the pupil.*—The motions of the pupil will be nearly as perfect as usual, at the commencement of cataract; it will expand in the absence of light and contract on its admission; but the motions of the pupil will be either altogether, or, in a great measure, destroyed when the patient is suffering from glaucoma, and I may further mention that the state of the iris is, for the most part, perfectly natural in simple cataract, but it is almost always projected towards the cornea in glaucoma.

7. *Cataract in combination with glaucoma.*—If cataract supervene on glaucoma, and if the cataract be fully developed when the case is first presented to our notice, the history of the disease, if faithfully related, will enable us to ascertain the combination of disease with tolerable certainty. But these two diseases may advance simultaneously, and this progression of the two affections will be evinced by the dulness of the pupil, the unhealthy appearance of the eye, the tension of the globe, and the very great degree of imperfection of vision which will be present compared with the existing and visible amount of opacity. If cataract supervene on glaucoma it is not probable that you would then be consulted on account of the dimness of vision inasmuch as the defect of sight will be very little influenced by the addition of cataract, but if the patient could not give a correct account of the progress of his disease, you would ascertain the existence of this combined affection by his inability to distinguish the ordinary degree of light, by the full and tense state of the globe, by the presence of pain and uneasiness there, and by its general unhealthy appearance,

in addition to the immobility of the pupil and various defective states of the iris. If glaucoma supervened upon cataract you would ascertain its existence by the presence of the symptoms I have just enumerated, and there would be remarked, in addition, an evident diminution of the capacity to distinguish degrees of light, as the last occurring disease advanced.

8. *Cataract in combination with amaurosis.*—The diagnosis of these diseases can only be in the slightest degree difficult when they advance simultaneously.

If cataract supervene upon amaurosis the history of the patient will enable us to ascertain the true state of things, but if that be wanting, if we can obtain no satisfactory account of the origin and progress of the malady, we must chiefly rely on the patient's incapacity to distinguish the ordinary amount of light which is usually perceived when cataract alone is present; on the mobility or otherwise of the pupil; and on any other general or local symptoms the case may present. When perfect amaurosis supervenes upon cataract, the pupil, which was before in a middle state between contraction and dilatation, will be enlarged, and will very probably become motionless; the capacity to distinguish the degrees of light will be destroyed, scintillations or muscæ volitantes may be present, and the new affection will most probably be characterized by some distinctly added symptoms indicative of its existence. If cataract and amaurosis arise nearly at the same time and advance simultaneously, the dimness of vision will be much greater than the mere opacity of the lens alone will explain; the pupil will be larger and less active than it ought to be; scintillations or muscæ volitantes may be present, and various other symptoms to which the particular variety of amaurosis from which the patient may be suffering will give rise, and which will not be obscured, as in the immediately preceding case, by a thoroughly opaque state of the lens.*

### SECTION IV.—PROGNOSIS.

In estimating the prognosis of cataract it is impossible for me to do more than present a mere outline—an epitomized view of the circumstances which would decide your opinion. It is impossible to state, within any reasonable limits, the particular prognosis of every case of cataract with which other morbid affections may be associated. In almost every case of congenital cataract where you have an opportunity of seeing the patient before he is eight years old, where the capacity to distinguish the degrees of light is possessed, and where the eye is in other respects healthy and perfectly formed, the prognosis, in reference to the probable result of an operation, will be very favourable. In every case where the cataract has been unproduced by, and is and has been obviously unassociated with, an inflammatory process, where the patient has the power of discriminating the degrees of light, and where the health is good and the eye perfectly formed, and, with the exception of the opacity of the lens, apparently healthy, the prognosis will also be *favourable;* and in making this statement, so far as it relates to the operation of extraction, you will understand me to imply that the eye is not very deeply seated in the orbit, that the cornea is of a good size, and that the iris is situated at a due distance from the cornea. Thus far we can speak confidently in reference to the kind, the character of prognosis, it would be safe and prudent to deliver.

---

* The importance of paying great attention to the history of cataract as a means of assisting in distinguishing it from amaurosis, has been long known. Dr. Turner (whose work on the *Art of Surgery*, was published more than a hundred years ago) quotes, upon the diagnosis of cataract, the following opinion of the celebrated Pitcairn. "Hence, it follows, that if the beginning of a cataract is accompanied with the representation of images floating about (muscæ volitantes?) then there is also in the eyes a gutta serena; and in such a case, although the cataract be removed by a surgeon, yet an incurable blindness will ensue, which often happens, and seemed to be the case of the patient of Timæus, in p. 55, book 1, where the honest man took that for a simple suffusion (cataract,) which was also a gutta (amaurosis.")—Dupuytren and Travers have known a transparent lens extracted, in a case of amaurosis, under an impression that the dimness of sight was occasioned solely by the presence of a black cataract.

Congenital cataracts may have existed under the favourable circumstances previously mentioned, but the patient may be more than twelve years old, and the capacity to distinguish the degrees of light may be less perfect than formerly, and the eye-ball may have acquired a rolling unsteady motion, and may be smaller—less perfectly developed—than usual. In such a case the prognosis should be a very guarded and cautious one; not so expressed as to deter the patient from seeking the only chance of obtaining relief, but, remembering the disposition of the retina to become permanently atonic when unaccustomed for many years to the influence of its natural stimulus, we ought certainly to promise much less than under the more favourable circumstances previously pointed out. When cataract is combined with a change in the form of the globe, with acute glaucoma or decided amaurosis, no prudent and well-informed surgeon would hazard his reputation by attempting an operation. When cataract has been produced by a general inflammatory state of the globe, when the iris is discoloured, or the pupil contracted from inflammation, or if the cataract has been caused by a wound which has also seriously injured other parts of the eye, the prognosis would be somewhat unfavourable. The eye, however, may be a most favourable one for operation, but the patient's health may be bad, he may be subject to gout or some other constitutional malady, or he may be excessively feeble or extremely old, and in all these cases the prognosis would be still somewhat unfavourable, more especially if considered in relation to the operation of extraction. On the contrary, the health may be excellent, the constitution sound, the powers of life vigorous, but the eye may be situated very deeply in its socket, or it may be irritable from some chronic disease, or the cornea may be extremely small, or the anterior chamber may be unusually diminutive, or the intertarsal slit may be very short, and in any of these cases (still considered in relation to the extraction of the lens) these formations or defects should be regarded as being more or less opposed to the success of the operation.

Commencing atrophy of the globe may be combined with cataract and will always render the case unfavourable, and generally hopeless, unless indeed this atrophic state arise from, and be dependent on, the existence of cataract. Again, if cataract be associated with an opacity of the cornea, the prognosis, in relation to the degree of vision the patient may acquire after having undergone the pain and inconvenience of an operation, will be modified by the nature and extent of the opacity and its situation in reference to the pupil.

## SECTION V.—PROGRESS OF CATARACT.—MODE OF EXAMINING AN EYE AFFECTED WITH CATARACT, AND VARIOUS CIRCUMSTANCES TO BE ATTENDED TO IN THE INVESTIGATION OF SUCH CASES.

*Progress of cataract.*—Many months or even years may elapse before cataract is fully developed. In old persons its progress is generally very slow when not produced by a blow upon the eye or some similar and equally evident cause, but when occasioned by local injury, it forms very quickly indeed, but not, as **Pott** has stated, "almost instantaneously." **Beer** mentions a case where a cataract formed immediately (?) in the eye of a woman who incautiously held a bottle of muriatic acid near to it.* **Eschenbach** and **Richter** have known a cataract form in the course of "one night" without local injury. **Richter** says that in the case mentioned by him the disease occurred from the sudden retrocession of gout. **Fernelius** states that he has known a cataract "framed in one day," independently of local injury. "Instances sometimes occur," says **Mr. B. Bell**, "in which cataracts form suddenly, and a total loss of sight, with complete opacity in the lens, takes place at once without any previous affection. I have now met with several instances in which the most complete opacity took place in the crystalline in the course of a few hours." **Mr. Wardrop** observes, "several instances have come within my own observation, where a patient has, in a few hours, become quite blind with this disease (cataract);" but he omits to say whether or not he refers to traumatic cataract. **Dr. Wendelström** relates a case in which cataract occurred in the eyes of a robust peasant "in the course of a few hours" quite independently of local injury. **Tenon** has also remarked the formation of cataract, under similar circumstances, "in the course of a few hours."

*Mode of examining an eye affected with cataract, and various circumstances to be attended to in the in-*

---

* If this case had not been related by so excellent an ophthalmologist I should have thought the opaque change produced by the fumes of the acid took place, not, as mentioned by **Beer**, in the lens, but in the texture of the cornea.

*vestigation of such cases.*—Before I enter upon this part of my subject I cannot forbear to quote a paragraph from a very admirable critique on the work of an excellent writer on ophthalmic maladies; which very aptly characterizes the conduct of many careless and superficial observers of the present day. "How often do we see the pretended oculist give a glance or two into an eye, and then exclaim, in a self complimentary tone, that there can be no doubt that the disease is a cataract; thus terminating his scanty investigation, and vain of his miserable diagnosis!" If this is the bare conclusion at which we are to arrive, this all the information our examination yields, we shall indeed be miserably deficient on the subject of diagnosis. I have heard of surgeons who pretend to treat the multiform diseases of the organ of vision with little more than a nominal acquaintance with three of its generalized morbid affections; inflammation of the eye is, according to their views, *ophthalmy;* loss of sight is, *gutta serena*; and a discoloured pupil is, *cataract.* Do such surgeons now exist or is my censure only applicable to a few practitioners of by-gone days?

*Characters of the opacity.*—I have now to explain some of the characters of the opacity of the lens or its capsule which constitute cataract.

The opacity constituting the cataract may be uniform throughout its entire surface, or it may be spotted, marbled, radiated, and irregularly streaked, and may present a great variety of similar appearances which it would be equally tedious and unnecessary to detail. It may be situated close to the iris, as when the cataract is soft or the anterior capsule alone is affected; or at some greater distance from it, as in the case of opacity of the posterior hemisphere of the capsule; or it may be intermediate as respects these two extremes, as at the commencement of the common hard lenticular cataract.

Its extent will vary, for it may occupy the centre of the capsule or the lens, or it may exist in the former on a greater or lesser extent of surface, and may be confined in the latter to its nucleus.

Its colour will be extremely various; if the case be one of capsular cataract, it will generally present a white, shining, and almost silvery appearance, either of a stellated or radiated form, or it will be dotted, marbled, or veined. If the case be one of lenticular cataract it will, usually, in early life, be of a grayish or bluish-white colour, and in more advanced age of a yellow or an amber tint. And, with regard to the external form of the opacity, that will vary with the seat of the cataract; it will be convex in capsulo-lenticular cataract, or when the anterior capsule only is affected, but, on the contrary, it will be concave, and, of course, more deeply-seated when the posterior capsule is the part diseased.

*State of the iris and pupil.*—Before making a final examination of an eye affected with cataract preparatory either to the performance of an operation, or to the delivery of a prognosis, in order to ascertain, as fully as possible, its characters and the state of the retina, it is desirable to expand the pupil by means of belladonna, or stramonium, or hyoscyamus. This will enable us to detect the characters of the opaque lens as regards its colour, its consistence, and the seat and extent of the opacity, much better than where we have not this advantage, and it will also assist us in ascertaining the true state of the retina; and, as regards the iris, whether or not it has acquired any morbid adhesions, and if any, their nature, their seat, and their extent, and also (what is of great moment) how far the pupil retains the capacity of being dilated by artificial means.

Of course, one important object of the examination will be, to ascertain the state of the iris and the condition of the pupil, and the points to which attention will be particularly directed in relation to the iris, will be, its colour, its equality or smoothness, and its polish, its form, its freedom from morbid adhesions, and its relations to the cornea and the anterior capsule. Has it undergone any change in its colour from previous inflammation? Is its surface plane, and smooth and polished, as in a state of health, or is it dull, rough and unequal, convex anteriorly, and pushed towards the neural surface of the cornea? Has it acquired any morbid adhesions to surrounding parts? Is it too near or too distant from the anterior capsule? Does it throw its due breadth of shadow upon that part? Is it tremulous and vacillating? And, with regard to the pupil, its condition should be investigated in particular reference to the following points. Does it act with its due degree of freedom? Is its border smooth, fine, delicate and definite? Is it perfectly circular, or is it puckered irregular and malformed? Is it very small or unusually ample? Does it retain its central position, or is it drawn more upwards or downwards, or to either side than it ought to be?

*State of the eye-ball.*—The general condition of the eye-ball is also entitled to attention. Is there any superficial or deep-seated inflammation present? Any varicose enlargement of the vessels of one or more of the textures of the eye? Is the eye-ball tenser or more flaccid than it ought to be? Is it the seat of pain or uneasiness? Has it undergone any enlargement or alteration in its figure? Has it acquired a rolling or rotatory motion? It will also be remarked, whether or not any change has taken place in the figure and transparency of the cornea.

*State of vision.*—Can the patient distinguish varying degrees of light? Can he see better in a bright than in a dull light? Can he tell when an opaque body is interposed between his eye and the light? Is the patient annoyed with muscæ volitantes, scintillations, or flashes of light?

*State of the eye-lids.*—The state of the eye-lids, and particularly of the tarsal margins, must be carefully ascertained; if they are irritable, if tumours exist, or if any mal-direction or mal-position of the eye-lashes are present, they must be removed before operating upon the cataract.

Such are the chief circumstances to which attention should be directed in the examination of an eye affected with cataract, and every surgeon should be able to obtain from such examination pretty satisfactory information respecting each of them; but there are still other circumstances connected with these cases, which I shall describe as the *general symptoms of cataract*.

### SECTION V.*—GENERAL SYMPTOMS OF CATARACT.

There are certain symptoms which are common to every variety of cataract and which are essentially necessary to the existence of the disease. There are other symptoms which are peculiar to given forms of it, and they will be mentioned in the description of the particular variety of cataract to which they belong.

1. *State of vision.*—The earliest symptom of cataract, as recognized by patients, is an imperfection of vision, they will say that their sight became slightly defective, that distant objects were less distinctly seen than usual, and that all objects appeared to be more or less cloudy, just as though they were inspected through the medium of a piece of glass which had been slightly breathed upon. This defect they will represent as increasing, until they are

compelled to place any substance they are desirous of distinguishing accurately, very close to their eyes, and their friends will notice that they view them with the eye a little inclined to one side—so, at least, that the object shall be placed laterally with respect to the eye, not in front of that organ. In fact the centre of the lens is, at this period, slightly cloudy, and cataractous individuals, when in this state, view objects laterally because the circumference of the lens, being as yet unaffected, is exposed to the light when the object is placed in an oblique direction in reference to the eye, and they are thus enabled to see the object more distinctly than they would do if the rays of light were allowed to pass through the cloudy central part of the lens. Such persons (presuming they are the subjects merely of simple cataract) will not complain of scintillations, nor, in many instances, of muscæ volitantes, objects will merely be seen as through a mist or cloud, by which also they will appear to be surrounded, and they will be compelled to place them near to the eye and to view them laterally in order that they may see them at all distinctly. As the disease advances this defect will increase, the cloudy, smoky appearance of objects will be much more considerable, their outline cannot be accurately detected, their position and situation is mistaken, and however closely they may be placed to the eye they cannot be distinctly discerned. By degrees the patient is deprived of every portion of *useful* sight, being enabled merely to distinguish the extreme degrees of light, and to discover the passage of an opaque substance when slowly moved between the eyes and a brilliant light.

2. *Opacity.*—The opacity, as I before stated, will be at first very slight, but, in the progress of the malady, it will become increased until vision is quite destroyed by it; its situation will, of course, vary with the variety of cataract

to which the particular case may belong, and its colour will usually be chiefly modified by the same circumstance. If the cataract be lenticular, the opacity will almost always commence in its centre, but, if capsular, it may begin at one or many points at, or nearly at, the same time, and very probably towards its ciliary edge.

3. *Black shadow upon the cataract.*—When the cataract is of a light colour and not in immediate contact with the iris, a black ring may be seen upon its surface, which will vary in breadth according to the distance at which the anterior capsule may be placed from the iris, and in intensity or distinctness in proportion to the lightness of the colour of the cataract. This black ring is merely a shadow from the neural aspect of the iris (the uvea) thrown upon the light-coloured surface which is situated near to it, and is always less, in the diameter of its inner circle, than the pupil. It is, of course, much broader and more distinctly seen in hard than in soft cataract, presuming the colour of both to be the same, and is not noticed at all, when, from the peculiar softness of the opaque lens, it is in close contact with the iris. It is scarcely to be observed where the cataract is of an unusually deep or dark-brown colour.

4. *State of the pupil.*—The magnitude of the pupil is somewhat increased in lenticular cataract, in order that the least opaque part of the lens may be exposed to the rays of light, and also in obedience to those laws which regulate the associated motions of the pupil with the retina. In the progress of cataract the patient will derive great advantage from the use of belladonna, which will have the effect of increasing the size of the pupil. In this way, by the use of this narcotic application, he may be conducted with comparative comfort through that stage of the disease which intervenes between a moderate defect

of vision and the period of the operation. I know that some surgeons object to its continued use, they say that its prolonged employment induces a torpid state of the retina, and that its susceptibility becomes permanently diminished under its influence; but although it has been used under my observation in these and other cases very extensively, and for a long period, I do not remember to have witnessed a single instance tending in the slightest degree to confirm this opinion. Indeed, I much question if it exerts more than the slightest possible influence upon the retina when applied to the eye-brow, its action, being, in my opinion, limited almost solely to the expansion of the pupil in a manner altogether independent of, and unconnected with, any prior or associated influence upon the retina.

The pupil will generally contract and expand very freely, even when a mature cataract is present, and this leads me to say a few words respecting the action of the iris in a state of health.

Before the diseases of the eye were much understood it was supposed that the iris had merely a sympathetic action altogether dependent upon the retina, and that when that membrane became insusceptible of the stimulus of light, the pupil was *necessarily* motionless and dilated; but it was impossible that so great an error could long remain uncorrected when the physiology and pathology of the eye became more closely investigated and better understood. When the iris was found to act freely in certain varieties of complete amaurosis and also in certain species of mature cataract, it was evident that such action could not depend on the sympathy of the iris with the impression of light upon the retina, inasmuch as that membrane was virtually insensible to its stimulus. The opinion that the action of the iris was sympathetic with the impression of light upon the retina, and upon that solely, was obviously no longer tenable, and it was at once evident from a close observation of the pupil of the sound eye and of that of the cataractous or amaurotic one, on the admission or removal of light, that the pupil of the amaurotic or cataractous organ acted in concert with that of the sound and healthy eye. Again—the mere exposure of a cataractous eye (where the lens is equally opaque in each organ) to a suddenly augmented degree of light, will sometimes induce great contraction of the pupil, and as the light could not materially affect the retina of either eye under such circumstances, it was equally evident that the iris was also susceptible of an action in consequence of the direct stimulus of light upon its texture. In accordance with these views I must distinguish these different actions of the iris; first, as produced by the direct agency of light upon its irritable and contractile texture; secondly, as excited by the stimulus of light upon the retina; and thirdly, as caused by virtue of a sympathy with the iris of the opposite organ. These three circumstances which may separately influence, but which in a state of health conjointly influence, the action of the iris, (and which, I believe, were first clearly pointed out by Mr. Guthrie) are entitled to great attention, and will afford, when properly inquired into, very useful information respecting the state of the retina in many forms of disease, although even a due attention to them will by no means always enable a surgeon to detect, with certainty, its true state under every variety of derangement of which that membrane may be the seat.

To recapitulate what may be termed, the general symptoms of simple uncomplicated cataract:—1, gradually increasing dimness of vision;—2, objects appearing to be enveloped in, and surrounded by, a thin mist or smoke;—

3, their outline first becoming indistinct and afterwards invisible;—4, a slowly advancing opacity behind the iris and between it and the vitreous humor, which opacity eventually becomes evident as a densely white, gray, green, bluish, or amber-coloured substance;—5, a dark circular shadow upon the surface of the cataract, (unless it be particularly soft or merely capsular) which shadow is most distinct when the iris is at a due distance from the anterior capsule, and the cataract is of a light colour;—6, slight dilatation of the pupil, without, in the general, the loss or impairment of its mobility, unless, indeed, the cataract is in contact with the neural surface of the iris.

## SECTION VI.—CLASSIFICATION OF CATARACT.

The classification of cataract which I have found to answer every practical purpose is a very simple and uncomplicated one. If with some authors I had been desirous of making every slight difference of consistence, colour, and extent, the foundation of a separate and distinct species, I might very easily have supplied a classification of cataracts which, for confusion and amplitude, might have rivalled some of our old nosological *arrangements.**

Cataracts are now usually divided into three classes; in the first, are included all primary opacities intervening between, and including, the capsular aspect of the hyaloid membrane and the corneal surface of the anterior capsule;

---

* Heister *(Institutiones Chirurgicæ.* Cap. lv.) and Sauvages, (*Nosologia Methodica.* Tom. 1, p. 719) and many other writers of the same period have subdivided the varieties of cataract to an unnecessary and very absurd extent.

in the second, are comprised those secondary cataracts which consist of small portions of the lens and its capsule left after former operations; and in the third class are comprehended all adventitious depositions and those opaque inflammatory secretions which are situated between the iris and the posterior capsule.

### SECTION VII.—TRUE PRIMARY CATARACT.

By the term *true primary cataract* is meant an opacity of either the capsular or lenticular texture, not the remains of cataractous disease on account of which an operation has been previously performed, nor consisting of a manifest and copious deposition of lymph either upon the surface or within the cavity of the crystalline capsule.

True primary cataract is divided into three kinds, namely, the capsular, the lenticular, and the capsulo-lenticular; the former of which may be conveniently subdivided and arranged as it may affect either the anterior or the posterior capsule.

### I.—ANTERIOR CAPSULAR CATARACT.

Anterior capsular cataract may exist alone, or it may be accompanied by any degree of opacity of either its posterior hemisphere or of the lens, although the latter almost invariably becomes opaque when any considerable part of its capsule has been long the seat of opacity. The opacity is situated very near to the iris, it is generally of a bright, shining, silvery appearance, but the capsule is not equally and uniformly opaque, it is generally either marbled or dotted, stellated or radiated, general or partial, in short, it may present a singularly variegated appearance which no verbal description will adequately explain; and all these little variations were formerly considered sufficient to constitute the basis of particular subdivisions, under the respective terms of *cataracta marmoracea, punctata, dimidiata, fenestrata, stellata,* and so on.

The opaque surface constituting the anterior capsular cataract is slightly convex, and is always situated at a very slight distance from the neural surface of the iris; the black ring I have previously mentioned,—the inner border of which is just within the circle of the pupil, and which is nothing more than the shadow of the uvea upon the light-coloured opacity—is almost invariably noticed. Vision is not generally so much impaired as in the lenticular variety of cataract, for the light is admitted between the opaque portions—the striæ—of the capsule, and, as the parts beneath are healthy, (at least they are presumed to be so for the purpose of my present description) the patient can do even more than perceive the degrees of light, until, indeed, the lens and posterior capsule become opaque also.

Capsular cataract usually begins at various parts of the capsule at the same time, and very commonly at or towards its circumference, whilst lenticular cataract, on the contrary, commences at its centre and gradually extends to its margin; it produces less indistinctness of vision than lenticular cataract, and is much closer to the iris; and to these modes of distinguishing capsular from lenticular cataract, I may add, that, in the former variety of this disease, the lens may be seen, as it gradually becomes opaque, between the dull parts of the capsule which are so often observed to exist in anterior capsular cataract. I mean to say, that, as the anterior capsule is not opaque throughout its whole extent, we may observe through those parts of it which remain transparent, the gradually increasing opacity of the lens.

### 2.—POSTERIOR CAPSULAR CATARACT.

Opacity of the posterior hemisphere of the capsule is rarely observed to exist alone; it is chiefly through the vessels which ramify upon it that the lens is presumed to obtain its vascular supply, and it is not surprising, therefore, that it (the lens) should so often participate in its disease; but whether such an intimacy of vascular connexion as I have now represented subsist between these parts or not, it is undeniably true that the lens is exceedingly prone to become opaque when the posterior capsule is the seat of cataract, and consequently, that the latter disease rarely exists alone for any great length of time.

The symptoms of opacity of the posterior hemisphere of the capsule do not differ in many respects from the opacity of its anterior portion. It is subject to the same varieties in respect to its marbled, dotted and radiated appearance; the opacity begins at many points at the same time, and generally at or towards its circumference; the patient has more than a mere perception of the degrees of light; but the extent of vision will be influenced less by the colour and density of the opacity than by the existence or absence of certain transparent portions of the capsule between the respective points of opacity. The opacity will also be deep-seated, and will present a concave or cupped appearance.

Although I have stated that the lens very generally becomes affected after the opacity of the posterior capsule has existed for some time, I do not mean to say that the opacity of the lens is a *necessary* consequence of that of the capsule; on the contrary, I have noticed many cases in which posterior capsular cataract has existed for many years, and in which the patient has possessed a certain degree of vision in consequence of the transmission of light through the intervening transparent portions of the capsule, and in which also the lens has never become thoroughly cataractous. However, the lens is much more liable to become opaque in posterior than in anterior capsular cataract, and that, too, at an earlier period of its existence. When posterior capsular cataract exists independently of an opaque state of the lens, it is distinguished by the concavity of its surface, the depth of its situation, and by its striated, dotted or radiated appearance, and generally also by its silvery whiteness.

### 3.—LENTICULAR CATARACT.

This variety of cataract has sometimes been arranged, according to its degree of consistence, into the fluid, the soft, the caseous, and the hard, but I have not considered it necessary to treat of them separately under these several divisions.

Lenticular cataract generally commences with a dulness of the centre of the lens, a slight dimness of vision, and an incapacity to distinguish objects accurately, unless they are either viewed laterally or brought closer to the eye than is customary. At the same time the objects of vision appear somewhat cloudy. As the disease advances, the dimness of vision becomes more considerable, the cloudy or misty state of objects and the surrounding halo are much increased, and the opacity of the lens is conspicuously evident, and has now extended quite or nearly to its circumference; its centre being more or less densely opaque. When the disease is fully developed the power of distinguishing objects is destroyed, although the patient is still able to discriminate extreme and suddenly contrasted degrees of light, and to ascertain the passage of an opaque substance between the eyes and a luminous body. The opacity of the lens itself is now distinctly witnessed, its centre and its circumference being either equally opaque or its central nucleus being obviously much more densely opaque than any other part; just as though an extremely opaque body of a circular figure had been introduced into the middle of a much larger one whose texture was only slightly opaque. The opacity will be plainly seen to be placed just behind the iris, the pigment upon the under surface of which will throw a distinctly-marked black circle of some breadth upon the cataract, if it be of a light colour and not situated too close to the iris. The pupil also will be slightly dilated. If the cataract be particularly soft, (as generally happens in very early life) its colour will be, in nearly every instance, white or a bluish-white or gray, and it will be in immediate contact with the neural surface of the iris, which may be even projected or pushed forward so as to assume a convex figure, the pupil will be quite motionless and, of course, no black shadow will be seen upon the surface of the cataract. In middle or advanced life, the opacity of the lens constituting cataract is generally yellowish or amber-coloured;* it may, however, be gray or white, it may even be of a dark-green hue. The action of the iris, presuming the case to be one of simple cataract, will be more or less free, a shadow will be thrown upon the surface of the cataract, and the iris will retain its natural plane, it will not, as in the former case, be pushed towards the cornea. It is stated that a black cataract may exist;* Baron Dupuytren says that he has never seen such a case; he says that Pelletan and Geraud presented to him a case of amaurosis which they considered to be an example of the *cataracta nigra*, and that, in opposition to his own judgment, he extracted the lens, which was perfectly transparent. A similar case is mentioned by Mr. Travers. (*A Synopsis, &c.* P. 148.)

---

* PETIT has stated, in the *Memoirs of the Royal Academy*, that the lens naturally begins to assume a yellow tint so early as the age of thirty, but I am confident that, as a general rule, no change in the transparency of the lens occurs at so early a period except as the effect of disease.

### 4.—CAPSULO-LENTICULAR CATARACT.

This is a very frequent and well-marked variety of cataract, and some medical writers have considered it necessary to divide it into many species or varieties. I shall first treat of what may be designated ***common capsulo-lenticular cataract***, and secondly, of ***cystic capsulo-lenticular cataract***.

---

* The black colour of some cataracts is admitted by Banister, Edwards, Janin, Maître-Jan, Riobé, Dionis, Boyer, Baerens, Tenon, Beer, Rosas, and Guthrie.—" Le crystallin, d'ailleurs, quoique noir, a perdu sa transparence d'une manière insensible; et après son extraction, le malade a la plus grande espérance de recouvrer la vue." Wenzel. *Manuel de l'oculiste*, Tom. 1, p. 150—The same author very minutely describes the case of General-Marichal Molck, who underwent the operation of extraction, and he says that the lens of each eye was "almost black." The operation succeeded in restoring vision. Pelier extracted the lens from each eye of an old man, and he says they were "as black as ink." Genettes found the crystalline lens "perfectly black" in the eye of an old woman who had been blind fifteen years. The case is minutely described, and it is stated that the central part of the lens was "black like ink." Guillié believes that "the spontaneous change of position of the black cataract is often mistaken for the cure of an amaurosis."

## COMMON CAPSULO-LENTICULAR CATARACT.

This variety of cataract includes, among the parts implicated in the morbid process, the anterior and posterior capsule and the lens; the opacity of these several parts is essentially necessary to constitute the complete capsulo-lenticular cataract, and, of course, the Morgagnian fluid may also have lost its transparency; it would scarcely be expected to remain transparent while the parts around, including the surface which secretes it, have become opaque.

The symptoms it may occasion in its progress, as respects vision, will correspond with those usually produced by common lenticular cataract, but its precise nature will be indicated in the course of its advancement by various symptoms, chiefly relating to the colour, the seat, the form of the surface, and other characters of the opacity. The posterior and the anterior capsule may become opaque, and the lens may, in consequence, also become opaque, but each of these parts may respectively become the seat of an opacity limited to its own texture, (as already described) and, as I have detailed the symptoms by which their progress would be known and pretty distinctly characterized, I need not repeat my remarks, as I should be obliged to do, if I adopted the same course in reference to the origin and progress of the present form of cataract. I shall presume that these parts (the lens, the two hemispheres of the capsule, and the Morgagnian fluid (?)) have all of them lost their transparency, and, in short, that capsulo-lenticular cataract is fully developed. Now in such case there will *generally* be a streaked, spotted, radiated, or marbled surface of a shining silvery-white appearance, and between the opaque portions which constitute the striæ or spots the capsule will be more or less transparent, and through these transparent parts the duller and more equal and extensive opacity of the lens may be distinguished. The power of discerning light will be less than in ordinary capsular or lenticular cataract at a similar stage of development, merely; and the opacity will always present a convex surface situated immediately beneath the neural aspect of the iris. When this form of cataract occurs in early life it will, of course, be soft, and will therefore be situated close to the iris, and it may even be sufficiently soft to project the iris forwards, in which case the pupil will be motionless and scarcely at all dilated, and the black shadow upon the surface of the cataract, always observed where the iris is in a healthy state, and the cataract of a light colour and at a due distance from the uvea, will be wanting. Sometimes the pupil will be sluggish—not absolutely motionless—and not at all larger than in its normal state. It will, however, always be as nearly motionless as possible when the soft cataract is pressing against the uvea. If this form of cataract (capsulo-lenticular) occur at the middle or latter periods of life it will be, in perhaps more than ninety cases out of a hundred, hard, and will not be in contact with the neural surface of the iris, and therefore will not project it forwards; the pupil will be somewhat dilated, but its motions will not be materially, and generally not at all, impeded; and the dark coloured shadow just within the circle of the pupil will be distinctly observed.

## CYSTIC CAPSULO-LENTICULAR CATARACT.

The form of cataract designated cystic capsulo-lenticular is one of rather infrequent occurrence, and sometimes arises from local injury, from a powerfully spasmodic action of the muscles of the globe, from a fall upon the head, concussion of the body, a blow upon the eye, or wound of the lens and its capsule. In other instances it may be the remnant of a congenital capsulo-lenticular cataract. We may, in fact, say that the disease consists of an opacity and atrophy of the lens in addition to the morbid changes in the capsule which contain it. There is, then, an opacity, and frequently an uncommon toughness and thickening, of the anterior and posterior capsule with—first, opacity, and eventually, partial absorption of the lens. The capsule becomes opaque, thick, tough, shrivelled, and corrugated, the lens, at first opaque, becomes in a great measure absorbed, or dwindles into a small brown knob like the withered and puny kernel in its shell.

This variety of cataract occupies a very small space and is often combined with other changes in some of the structures of the eye; but if the eye be in other respects healthy the action of the iris will not be impeded—at least it often acts very freely under such circumstances—the pupil will be merely slightly dilated, and the posterior chamber will be somewhat enlarged. The shrivelled opaque lens may or may not move about in its capsule—that will depend on the extent to which its two hemispheres are separated from each other. The capsule is not so white and silvery in appearance as in other forms of opacity of the capsule, it is more generally of a yellowish or dark-brown colour, and I have seen it of a pale blue or light slate colour. As the capsule is extremely thick and densely opaque, vision is, of course, much more completely destroyed in this than in many other forms of cataract.

I may remark, that, as a blow or other injury of the eye or head frequently cause the cystic cataract, it is very apt to be a combined and complicated affection, and is especially liable to be associated with amaurosis; in fact, the same injury which produces the cataract is exceedingly apt to give rise to amaurosis, or to some morbid affection of the cornea or the iris, or of the globe of the eye.

The description of cystic cataract contained in the work of Beer, is a very curious one, and is far from possessing that perspicuity and accuracy by which his graphic delineations of the morbid affections of the eye are so generally distinguished. He says "the cystic cataract is always, or almost always, the consequence of a violent blow in the neighbourhood of the eye, and of concussion of that organ. The lens, inclosed in its capsule, is loosened at the time of the accident from the surrounding parts, from the vitreous humor and the hyaloid membrane, in a word, from all its vital connexions. The capsule quickly becomes opaque from the action of the aqueous humor, the lens becomes opaque, the lens dissolves, and the capsule becomes much thickened." When the lens and its capsule become displaced, when the capsule, without being punctured, becomes detatched from its connexions, and thrown (with the lens it contains) into the posterior, or, as more generally happens, is propelled through the pupil into the anterior chamber, the lens certainly becomes opaque, (but it is not usually absorbed) and the capsule sometimes retains its transparency. The lens is prevented from being absorbed by being covered by its capsule, which capsule is itself detached from its vital connexions, and it is on this account that an operation is so generally required for the removal of a lens so situated. I do not recognise any such form of cataract as the "cystic cataract" of Beer.

When the capsule is punctured without being detached from its connexions, it will, very probably, become opaque and thickened, and the lens will be dissolved and will become absorbed, but I do not believe that the lens often or generally becomes dissolved and absorbed so long as it remains in its unruptured or undivided capsule, when that capsule is displaced and "detached from all its vital connexions." But, of course, I do not wish to imply a belief that the lens remains unacted upon by the absorbents when displaced and uncovered by the capsule. It is evident that when the lens is displaced and covered by its capsule, its texture cannot be removed by the absorbents of the capsule, neither can it be removed by the absorbents of any other part whilst the capsular texture remains entire. The description of cystic cataract, as given by the celebrated **Beer**, appears to apply to a particular form of dislocation of the lens, or to a condition of disease in which the crystalline becomes opaque (without being displaced) from concussion of the eye-ball, is afterwards absorbed or nearly absorbed by the vessels of the capsule, which subsequently loses its transparency, its two hemispheres approaching, becoming thickened, and undergoing various other morbid changes.

The cystic cataract according to my description of, and opinions concerning, the disease, essentially consists of an opacity and thickening, or corrugation and puckering of the capsule, *which retains its situation and its natural attachment;* partial or total absorption of the lens, which is converted into a small, firm, wasted, and yellow or deep-brown coloured substance; and is almost always caused by some form of local injury or some powerfully spasmodic action of the muscles of the eye-ball. The displacement of the lens and its capsule is altogether distinct from the morbid affection to which I am now directing attention.

CONCLUDING OBSERVATIONS ON THE VARIOUS FORMS OF TRUE PRIMARY CATARACT.—There is sometimes noticed a singular form of opacity either of the crystalline lens or its capsule, and it consists of a minute circular opaque spot either situated in the anterior capsule or in the centre of the lens;* it may occur from disease—it may constitute a morbid process developed after the period of birth—but I have more commonly observed it as a congenital form of disease. The same thing takes place in the eyes of horses, and in them also it is situated either in the centre of the lens or the capsule, and in the former case it resembles a minute white circular pebble imbedded in the centre of the lenticular substance which, in every other part, retains its natural transparency.

As to the Morgagnian cataract of authors I really do not intend to speak of it as a separate disease. Of course, the liquor Morgagni may become opaque when the lens and its capsule have lost their transparency,† but I have never seen any form of cataract leading to any serious impairment of vision in which the liquor Morgagni was alone opaque—the capsule and the lens being transparent. RICHTER says he has met with a case of Morgagnian cataract;—"no sooner (says he) had I punctured the capsule, than two or three drops of a whitish fluid flowed out, and the same moment the pupil became clear and the patient saw. Three months afterwards, a cataract took place in the same eye, which *in all probability* was seated in the body of the lens itself." These remarks of RICHTER are exceedingly imprecise, inconclusive, and unsatisfactory—in fact, they are far from proving the existence of the disease he intended them to illustrate. We find on reading RICHTER's work that the Morgagnian cataract is mentioned by him as one of the five kinds into which he has divided cataracts; he says, the seat of cataract may be "the liquor Morgagni singly." WENZEL in his *Manual* remarks "il arrive quelquefois que cette humeur (humeur de Morgagni) est seule opaque, mais plus souvent le crystallin l'est aussi. Cette même humeur est quelquefois semblable au meconium qui enduit les premières voies des enfans nouveaux nés."

---

* WALTHER has considered this central opacity of the lens to be owing to a check given to the generative impulse, by which the circumference of the lens alone has acquired transparency, and adduces this fact as corroborating his views respecting the opacity of the lens in the early period of intra-uterine existence.

† M. HOIN appears to think differently; he says, "quelquefois ces deux cataractes (capsular and lenticular) se trouvent ensemble dans le même œil; alors la capsule naturellement séparée du crystallin par l'humeur de Morgagni, y est presque toujours adhérente, et l'opération tentée sur un œil ainsi affecté doit communément être infructueuse." *Mémoires de l'académie royale de chirurgie.* Tom. ii, p. 425.

I need not point out in detail what changes of colour and consistence and other qualities the secretion of a serous membrane may undergo, they are many and various, and I do not deem it right to restrict them, even in this situation, to one or two trivial morbid alterations. In estimating the changes the Morgagnian secretion may experience, we must take into consideration all the changes which the texture of the part secreting that fluid may undergo—all the diseased and disordered states to which it is liable.

## SECTION VIII.—MISCELLANEOUS QUESTIONS RELATIVE TO CATARACT.

1. MEANS OF DISTINGUISHING HARD FROM SOFT CATARACT.—We have previously pointed out the means of distinguishing cataract as it may occur in the anterior or the posterior capsule, or the lens—in one of these parts

singly, or in two or more of them combined; and it is desirable to be enabled to ascertain, as far as the distinction is practicable, the various degrees of consistence which the opaque lens may possess. But, it may be asked, is it possible to discover by an examination of the eye, and by an investigation of the circumstances connected with the formation of the opacity of the lens, whether the cataract is soft or hard? This question is most important, viewed in connexion with the adaptation of an operation to the cure of any particular variety of cataract. Many excellent writers (POTT, SCARPA,) say that we cannot determine this matter with certainty, and I am quite confident that the question cannot always be decided correctly—we cannot decide it with *invariable precision* prior to the performance of an operation. When lenticular cataract occurs in very early life it is always soft, unless the lens be the seat of cretaceous or osseous deposition. MR. LAWRENCE says he has never met with a hard cataract prior to adult age. When the lens is of a white or milky colour and is in contact with, or is exceedingly close to, the iris, it is generally soft, and when cataract takes place in advanced age and is of a yellow or amber colour, and is not in contact with the iris, and receives its proper shadow from the uvea, the lens is almost invariably hard, and the capacity to discriminate the degrees of light is greater than where the lens is soft and is pressing against the neural surface of the iris.

RICHTER observes "there is hardly any characteristic mark of a soft or hard cataract that is to be depended on. There are, however, two symptoms that I shall just now communicate to my readers, which, although I cannot say they have never, yet have very seldom, deceived me. The softer the lens is, the larger and thicker it is in general, and therefore approaches nearer to the edge of the pupil; hence I always conclude that the cataract is large when it is near the pupil; and in this I have found myself *but seldom* deceived.*

"Further, we are sometimes able to discern on the cataract points, streaks, or other marks. If, after having attentively observed the place, figure, and disposition of these, we find that in some days afterwards, or upon rubbing the eye pretty hard, they have undergone any change in their figure or situation, we may then conclude with certainty that the cataract is soft; only we must be cautious not to draw an opposite conclusion; I mean, that we are not to conceive the cataract to be hard if these should happen to suffer no change."

The following remarks which partly belong to BEER, and partly to MR. WARDROP, are entitled to every attention, and contain a vast deal of sound practical information. "There are scarcely any diagnostic marks of a soft and hard cataract which can be altogether depended on. The soft cataract may, however, be in general distinguished from the large size of the opaque body, its near approach towards the plane of the iris, or edge of the pupil, its white colour, and from having points, streaks, or inequalities, which vary their appearances at different times. The blindness, too, by which soft cataract is accompanied, is always considerable; for when the whole lens is opaque, the patient can derive *no benefit* from the great dilatation of the pupil, which is produced by shading the eyes, or by the influence of belladonna, and can seldom see more than differences in the intensity of light.

---

* The opinion of MR. GUTHRIE pretty nearly accords with that of RICHTER. He says, "although a hard cataract preserves its natural size, or is even less, and therefore at a distance from the iris, a soft cataract is *not always* protuberant." See *Pamphlet.*

"When the cataract is hard, the opaque body is neither so large nor so close to the edge of the pupil as when it is soft, so that a sufficient number of rays of light can enter, and the patient is still capable of distinguishing some objects from the side of the eye. The hard cataract has the same shade of colour throughout the whole lens, and its natural smooth surface may be remarked; the motions of the pupil are extremely lively, and it seldom remains much enlarged. The opacity behind the pupil is, at the commencement of the disease, observed in the middle, and then extends, very slowly, towards the circumference of the lens. The colour of the hard cataract is usually *gray*, passing more or less to a *bluish* hue.

"It has generally been remarked, that the fluid, or milky cataract, is the most frequent form of the disease in children, and that the solid or concrete cataract is most common in the adult. *Soft cataracts, however, are by no means unusually met with in those in advanced life.*"*

I believe some parts of the preceding statements are quite inaccurate, and it appears to me that some others require qualification or further explanation.

2. MEASURES TO BE ADOPTED DURING THE PROGRESS OF CATARACT FOR THE PURPOSE OF ASSISTING THE PATIENT'S VISION.—It is necessary that a certain portion of light should fall upon the retina, in order that objects may be distinctly seen. This portion of light differs in different animals according to its habits and the anatomical construction of the eye, and it varies in man according to the natural sensibility or degree of susceptibility of the retina,

---

* *Morbid Anatomy.* Vol. ii, p. 91.—MR. GUTHRIE states, in a *pamphlet* published a short time ago, that "the operation of extraction ought only to be performed in cases of hard cataract, which may be easily distinguished from all others."

and other causes. In the healthy state of the eye the amount of light transmitted to the retina is regulated in a great measure by the magnitude of the pupil. When the crystalline lens is rendered slightly opaque, the light it transmits constitutes but a very small portion of that which falls upon the surface of the cornea, so that the patient is, at first—during the early part of the progress of the cataract—as much embarrassed to discover the objects he is desirous of inspecting, as an individual, whose eyes are healthy, would be, if examining objects through the medium of a piece of glass which had been a little breathed upon, or if situated in a foggy atmosphere, or placed in an exceedingly smoky apartment. To diminish this defect the pupil expands, and this expansion of the pupil takes place gradually in correspondence with the increasing opacity of the lens, so as to permit the light to be transmitted through its circumference or least opaque parts, and in this way, the effects of the disease upon vision may be so gradual, and at first so slight, that the patient may not apply for relief, until there exists a considerable degree of opacity. The object of this gradually increasing dilatation of the pupil is sufficiently evident; the opacity usually commences in the centre of the lens, (I am now speaking of hard cataract) and may be very considerable there before it has extended far towards its circumference, which may be perfectly healthy and quite transparent, so that during a contracted state of the pupil the central opaque portion of the lens will alone be exposed to the light, but, when the pupil is fully dilated, its transparent portion will be exposed to view, and the patient will be enabled to see objects, by viewing them laterally and placing them very near to the eye, almost as distinctly as though no opacity of the lens whatever existed.

As the progress of cataract is generally slow, as its maturation and perfect development may occupy many months, and even years, and as the patient will, under ordinary circumstances, be enabled to do little more during the major part of this period than just to find his way from place to place, he has a long period of cheerlessness and inactivity before him, ere it is considered advisable to attempt the restoration of vision; but if the pupil be dilated by artificial means, he will often be enabled to amuse himself with reading, or, when he is no longer able to distinguish a clear and large type, he may engage in other avocations from the pursuit of which he was previously debarred. This object may be acomplished, and these advantages may be secured, by the local application of belladonna to the forehead every evening at bed time, or every other evening, just as the effects of the former application may be more or less permanent; and I prefer to employ the belladonna in this manner, rather than by dropping a solution of it into the eye, because it has a tendency, when employed in this latter mode for any great length of time, to render the eyes irritable, and consequently to interfere with their favourable state for the performance of an operation when its performance becomes necessary. If immediate and great dilatation of the pupil is required to promote the increase of vision for some particular purpose, the belladonna drops may be advantageously used. I do not know that any other measures are required to insure to the patient all the advantages the nature of his disease permits him to enjoy. He may also be directed to adopt every measure calculated to improve the state of his general health, and to avoid all things tending to render his eyes weak and irritable. Many persons have their sight improved during the progress of cataract by the use of double convex glasses of a slight magnifying power, and there is no objection whatever to their use; and, of course, where the individual has been for a long time previously in the habit of wearing spectacles it may be necessary to recommend some alteration in their focal power. Such, then, are the measures to be adopted for the purpose of increasing the patient's vision during the progress of this disease, when the cataract advances slowly, and when the iris is capable of being influenced by the agency of the belladonna or other narcotic applications.

### SECTION IX.—TREATMENT OF CATARACT.

When cataract is fully formed, the eye being perfectly healthy in other respects, vision can only be restored by means of a surgical operation, at least I am not aware that the adoption of any measures short of this, will effect the removal of cataract. But formerly it was supposed that certain medicines were useful, that friction of the eye-ball and the application of various stimulating vapours to the surface of the eye were beneficial, and that these measures possessed the power of checking the progress of the cataract, and either had the effect of inducing its absorption when fully formed, or of restoring the clearness of the opaque lens when its transparency was only slightly impaired. This was the general opinion at the time HEISTER published his *Institutiones Chirurgicæ;* it was also, as will be peceived by the following statement, the opinion of HEISTER himself. "Ad suffusionis autem sive cataractæ curationem quod attinet, duplici potissimum ratione institui eadem potest. Vel enim a medicamentis; vel ab acu seu ferramento salutis præsidia petuntur." SAUVAGES states that a mature cataract was fully cured in eight days by the use of a few grains of henbane. Banister recommends the cure of cataract to be attempted by attention to the diet, and by the application of stimulating lotions to the eye. Boerhaave says, "mercurius sæpe perfectas cataractas solvit." Chalibert asserts that "an infant cataract is susceptible of being remedied by an aromatic spirituous composition, the strength of which must be proportioned to the degree of the malady." Hovius has the following remark respecting the treatment of cataract;—"cœpi pertinaci studio disquirere mecum; an alia eam tollendi methodus excogitari posset; quæsivi, inveni, qua cataracta sive mollis ac fluida, sive debitam habeat consistentiam, sive antiquata et tenax omni tempore, secure, immune, tuto absque ullo visus incommodo, aut imminenti periculo, tolli queat." The treatment he recommends consists in the administration of *balsamic* medicines. Barbette asserts that the "imperfecta cataracta externis medicamentis in principio facillime curatur, præsertim si corpora sint sana, et patientes mediocris ætatis." Such also was the opinion of Ettmuller; "pro cura" says he (when speaking of the treatment of cataract) "substantia ista heterogenea ante sui concretionem discutienda, concreta resolvenda et dissipanda, aut saltem chirurgicâ manu deprimenda." "On vient," says the celebrated Dionis, "par deux voyes à la guérison de la cataracte, par des remèdes ordinaires, ou par la chirurgie; les remèdes peuvent la guérir quand elle ne fait que de commencer; mais il n'y a que la chirurgie qui en puisse venir à bout quand la maladie est confirmée." Van Swieten speaks of a case in which each lens and the cornea of each eye being opaque, the corrosive sublimate was administered "cum eventu felicissimo." (See vol. 1, p. 451.) "In confirmed cataracts," says Mr. B. Bell, "of long duration, no advantage is ever derived from any internal medicine;

but in the incipient state of the disease, before the opacity of the lens is complete, mercury has in some cases proved useful."[*] Mr. Ware says "the remedies which have appeared to me more effectual than others in these cases (cases of cataract) have been the application to the eye itself of one or two drops of æther, once or twice in the course of the day; and occasional frictions of the eye, over the lid, with the point of the finger, first moistened with a weak volatile or mercurial liniment." M. Gondret has recently stated that he has succeeded in removing opacity of the lens by the formation of issues in the neighbourhood of the eye, by the application of stimulants to its surface, and by the aid of electricity. Walther asserts that he has successfully combatted incipient cataract without having recourse to an operation. Dieterich observes that "in incipient cataract, it is very probable that the formation of the complaint may be prevented by the mere evacuation of the aqueous humor." Valentin affirms that he has prevented the formation and ripening of incipient cataracts, by repeated emetics. Larrey remarks "le defaut d'action dans les membranes du globe de l'œil, la cataracte commencante indique veritablement l'application du moxa." "I once succeeded" says Mr. Simmons, "in the dispersion of cataracts of four years duration, by dropping æther into the eyes, and drawing electric sparks from them, as strong as could well be borne by the patient." CHANDLER also, speaking of the treatment of cataract, remarks "but what bids the fairest for success, is the elective fluid conveyed in a stream to the eye." MR. GUTHRIE says, in connexion with this subject, "admitting, as I do, that an operation on one eye is certainly capable in some instances of causing the removal of a commencing opacity in the other; it is reasonable to suppose that some means may yet be found of effecting this object in a certain and more satisfactory manner. Incipient cataracts ought not, therefore, to be left until the opacity is complete, but should be submitted to a treatment adapted to the age and habit of the patient." I find it recently stated *(Medical and Surgical Journal)* by MR. MARSHALL, that he has removed cataract by the use of certain drops, respecting the composition of which he has not, however, as yet furnished the possession with any satisfactory information. I feel myself justified in stating that the opinion that cataract—fully formed lenticular cataract—can be cured without a surgical operation, is now very properly abandoned; we are, in short, compelled to admit that the performance of a surgical operation is the only feasible method of attempting the restoration of vision when destroyed by the existence of fully formed cataract. I do not, however, mean to deny, that the capsule of the lens may become opaque in consequence of capsular inflammation, and in this way produce a cataractous opacity of that part, and that where this effect has commenced—where the capsule has been inflamed, and its commencing opacity indicates the commencement of lymphatic deposition—such inflammation and incipient opacity have been relieved and removed by appropriate treatment. So far, then, I am not only unprepared to deny, but justified in affirming, that incipient capsular cataract may be removed simply by the successful adoption of treatment for the cure of the capsular inflammation on which the cataractous disease depends.

---

[*] Demours explains the amendment which sometimes follows the administration of medicines in cases of (presumed) incipient cataract, by saying, "j'ai vu même, mais beaucoup plus rarement, une opacité déja très-visible disparaître, et le malade, privé de la faculté de lire, en recouvrer l'usage. Dans ce cas, la maladie a toujours eu pour moi, son siége dans un léger engorgement de la capsule, et ce sont là, je crois, les occasions qui ont fait regarder l'opacité déja sensible du cristallin comme susceptible d'être utilement attaquée par des remèdes internes et externes."

There yet remain a few questions which it may be necessary to discuss, before entering upon a description of the various operations the different forms of cataract require, and they may be conveniently arranged in the following order.—1. At what period of the existence of cataract is it judicious to operate? 2. What are the circumstances which would decide our selection of any particular kind of operation? 3. When cataract exists in one eye only, is it advisable to attempt its cure by means of a surgical operation so long as the vision of the opposite eye is unimpaired? 4. What is the nature of the treatment it may be advisable to adopt, in the general, preparatory and immediately antecedent to, the performance of an operation?

1. AT WHAT PERIOD OF THE EXISTENCE OF CATARACT IS IT JUDICIOUS TO OPERATE?—It has been supposed that during the progress of cataract, the eye is much more susceptible of inflammation than where no such disease exists, (this is particularly insisted upon by GLEIZE) and that if we attempt its removal before it is fully formed—perfectly matured—inflammation will be much more likely to occur than where the same operation is undertaken under the usual circumstances, that is, when the lens has become perfectly and densely opaque. There is no direct evidence in proof of this fact, and I do not believe there is any true foundation for the opinion it involves; but there are other considerations connected with this subject which sufficiently evince the impropriety of operating for cataract, so long as the patient enjoys a sufficient share of vision to enable him to find his way about without

material inconvenience, to cut his food, and, in short, to surmount similar familiar tests of the state of his vision. If the result of the operation be not successful, the patient will very probably see more indistinctly than he did before it was performed, and having been led to expect the customary chances of not merely an improvement in his sight, but its almost perfect restoration, he will be much more chagrined to find his vision destroyed, when, at the time the operation was performed he enjoyed a certain degree of sight, than he would be, if his sight had been previously altogether destroyed. Now, this is a prudential reason as regards the surgeon rather than an important consideration as relates to the patient's welfare, but in the practice of our profession it is highly necessary to uphold its importance and value in public estimation, and to avoid every opportunity of needlessly hazarding its reputation with those who are the usual objects of its exercise. In the one case the patient's expression of disappointment may deter others from seeking to obtain the restoration of vision, but in the other instance no such result is likely to take place, for, if the patient's sight be quite lost before an operation is undertaken, its unsuccessful result does not leave him much worse, in his estimation at least, than he was at the time it was performed; the disappointment at all events is much less than in the former case, and as the actual pain produced by the operation is by no means considerable, he will not much regret that he has endeavoured to obtain, at so trifling an expense of bodily suffering, the restoration of his vision.

When cataract is fully formed in one eye and is forming in the other, we may, when vision becomes very imperfect, remove the opaque lens from the eye in which the fully formed cataract exists. The object of this recommendation is to prevent the patient from being in a state of total or almost total darkness, which would occur if an operation were delayed until the cataract became absolutely mature in each eye. It is stated by many writers, and particularly by St. Yves and Dr. Bowen, that the removal of a mature cataract from one eye prevents the occurrence of the disease in the other, or, if the lens of one eye has begun to be opaque, that its transparency is restored by the performance of the customary operation in the opposite organ, but the statement is altogether erroneous, at least I have seen nothing in my own practice to justify any such conclusion. Mr. Guthrie, as I have already mentioned, expressly states "that an operation (for the removal of an opaque lens) on one eye is certainly capable, in some instances, of causing the removal of a commencing opacity in the other." Himley mentions two instances in which the removal of a mature cataract from one eye, caused the disappearance of a commencing opacity in the crystalline lens of the opposite eye. And Beer states that in numerous cases in which he has removed cataract which has formed in one eye, no similar disease has ever occurred in the lens of the other organ, that is, presuming it to be healthy at the time the operation was performed upon its fellow.

2. WHAT ARE THE CIRCUMSTANCES WHICH WOULD DECIDE OUR SELECTION OF ANY PARTICULAR OPERATION FOR THE CURE OF CATARACT?—Until the publication of Beer's ophthalmological remarks many surgeons were in the habit of employing the same operation for the cure of all the varieties of cataract, and in whatever subject it might exist; the soft cataract of children was too often subjected to precisely the same method of treatment, as the hard cataract occurring in persons in advanced life. The following observations, which are contained in the first volume of the *Quarterly Journal of Foreign Medicine*

*and Surgery*, very fully illustrate the preceding statement. "As Professor BEER," says the writer, "is no charlatan, and has no trifling invention of his own to announce, he recommends the cure of cataract to be attempted, according to the circumstances of the case, by depression, extraction, or division; and expresses himself with much warmth against those ignorant and unprincipled men, who would persuade the public that they had improved any one of these operations, so as to operate safely and successfully in all cases of cataract, by one method exclusively. The depression of a large cataract, the extraction of a soft one, the division of a hard one, are three surgical solecisms."

Now, in cases of congenital cataract, the operation of keratonyxis (when the patient is not more than six years old) appears to be preferable to every other; because it is very easily performed, gives very little pain, and is fully adequate to the cure of the disease. The puncture of the cornea is certainly much less painful than the puncture of the sclerotica. If, however, we are disposed to operate upon an infant a few months after birth, the thickness of the cornea, and the proximity of the iris to its neural surface, would render this operation objectionable. It would then be better to perform the posterior operation of solution, for it would not at that age be very easy to pass the needle through the cornea without injuring the iris. But when the disease occurs at a more advanced age, say between ten and thirty, it would be better to perform the posterior operation of solution; because the lens may require comminution to insure its absorption, which cannot easily be effected by passing the cataract needle through the cornea, as in the former case, where the mere laceration of the capsule is alone, often sufficient to accomplish a cure, by admitting the aqueous humor to that portion of the opaque lens which has not floated into the anterior chamber as soon as the capsule was punctured. We have much less command over the point of the needle, we can move it about much less freely when it is passed through the cornea than when it is directed through the sclerotica, and, on this account, keratonyxis is not so well adapted to the cure of cataract occurring between the ages of ten and thirty, as the posterior operation of solution, which, as a general rule, in cases occurring at any age between those periods, it would be advisable to employ. In both these cases the lens is not presumed to have acquired a great degree of hardness—it may be easily broken into fragments with the point of a needle; unless, indeed, it be a singularly rare exception to the general rule, for it may, even at this period of life, have become ossified. After this period the lens will frequently acquire a much increased degree of firmness and consistence, and these changes in the density of the lens will be characterized at different ages by symptoms sufficiently distinct in the general (I do not say invariably) to enable us to form a pretty correct diagnosis. Knowing the lens to be hard and of its proper size it would, of course, be wrong to perform the anterior or posterior operation of solution, inasmuch as we might totally fail in our attempts to cut it into fragments, or, if we did divide it, we should scarcely be able to separate it into more than two or three pieces, and in either case only after the infliction of serious injury to the delicate textures of the eye, on account of the force it would be necessary to employ. I make this statement from a practical acquaintance with the evils resulting from the plan suggested by Sir W. ADAMS, namely, that of slicing the hard lens *in situ*, and, in the event of its becoming displaced and exciting irritation, of extracting it by an incision of the cornea.* As a consequence of these manipulations severe inflammation would arise from the forcible movements of the point of the needle, and, in addition to the parts actually punctured by the instrument, the iris, the cornea, and the vitreous humor, would be more or less injured; and the lodgment of the lens, either in an entire state or only divided into two or three masses, would not merely maintain the irritation produced by the direct injury to other parts, but would also give rise to all the irritation the pressure of a foreign body against the iris and its residence within the chambers of the eye, are capable of exciting; so that we may really be compelled to extract them under circumstances singularly unfavourable to the success of the operation. Now this has happened, not indeed to myself but to others; I have witnessed it twice, the posterior operation of solution was attempted in both cases, and they both occurred in very old persons, but notwithstanding their age, and the consequent almost certainty that the cataracts were hard, the surgeon told me he preferred that kind of operation, and it would have been uncivil to have explained to him the very obvious cause of his preference. The lens was, in one of the cases, divided, and in the other it was dislocated in its entire state, and in both instances the residence of these hard bodies in the chambers of an eye rendered irritable by the infliction of other injury, gave rise to a degree of inflammation which terminated in suppuration and collapse of the globe, so that it may be imagined the inflammation was particularly acute. And I may remark *en passant* that an accident of this nature (the dislocation of the lens) first led DAVIEL to extract the lens, and hence the revival and introduction to more general notice of the operation of extraction; undoubtedly DAVIEL greatly contributed to bring the operation of extraction into general notice and repute.

---

* Dr. Ryan advises, that in attempting the cure of hard lenticular cataract, the needle should be passed through the sclerotica a little behind the margin of the cornea, so that its point may push the opaque lens into the anterior chamber, and fix it firmly against the cornea; the lens is to be held in this situation, and "cut down upon"—the cornea being then incised "as for extraction." (*Transactions of the Association of the King and Queen's College of Physicians in Ireland.* Vol. iv. page 260.) This notable statement is succeeded by an attempt to secure to its author the credit of a represented discovery. Muter has described an instrument by which he divides the anterior capsule and dislocates the lens, immediately before he makes the necessary division of the cornea. (*Practical Observations, &c.* P. 40.) I can perceive no other effect of adopting this suggestion than that of complicating and prolonging the operation, and increasing the subsequent inflammation.

It would appear, then, that the operation of solution is not adapted to cases of hard lenticular cataract, neither is it advisable to cut it to pieces *in situ*, nor to displace it into the anterior chamber and afterwards extract it.

There are, indeed, three kinds of operation employed in these cases, in cases I mean of hard lenticular cataract:—the first is termed *extraction*, because the lens is at once and altogether removed from the eye; the second is called *depression*, because the lens is depressed beneath the pupil; and the third is designated *reclination*, because the lens is reclined, in nearly an horizontal position, into the vitreous humor. But there is no one of these operations applicable to all cases of hard cataract, and we proceed to point out those circumstances which render the one or the other preferable.

When cataract takes places in an extremely old, or in a very feeble individual, reclination or depression should be preferred to extraction (unless there was reason to believe that the lens was unusually large) on account of the tendency to sloughing of the cornea in such persons and the hazard of there being an insufficient degree of reparative power to effect the union of the divided cornea, and

I wish to mention the circumstance most particularly, for I have very often witnessed this occurrence. If a surgeon be unaware of this fact, he will employ depletory measures to remove the swelling of the lids, the chemosis, and the ophthalmia which usually accompany sloughing of the cornea, and thus effectually prevent the chances of preserving its vitality, and indeed render its destruction inevitable. Where the vital powers of a patient are so feeble, so much reduced as to cause any apprehension respecting the reunion of the corneal flap, or any fear of sloughing of the cornea after separating it so extensively from its vital connexions as must be done in performing the operation of extraction, it would be better to perform one of the operations previously mentioned, namely, reclination or depression; presuming, of course, that there exists no reason to believe that the lens is unusually large. The cornea may be relatively very small, it may not possess its average proportionate degree of size compared with the magnitude of the eye-ball;* and in such cases the lessened dimensions of the lens are not always in accordance with those of the cornea, but with the size of the other parts of the globe, and of the globe, with respect to its totality; in such a case, therefore, it might be difficult to remove the lens through an incision of the cornea, unless two-thirds at least of that tunic be divided, which is always hazardous, and frequently leads to sloughing and staphyloma of the cornea, and other evil effects upon various parts of the eye. If the incision of the cornea be not unusually extensive—do not comprehend nearly two-thirds of its extent—it must on the other hand be made *at* the corneo-sclerotic junction, which is opposed to the proper and salutary union of parts. Again, the anterior chamber may be unusually small, owing either to a very flattened state of the cornea, or to the convexity of the iris, or from its being from some cause or other situated very near to the neural surface of the cornea, and if we then attempt the operation of extraction, we shall be very likely to incise and injure the iris; this, then, is also a case either for reclination or depression. The eye-ball may be very deeply seated in the orbit—the bones of the orbit may so project in front of the eye that we cannot conveniently puncture the cornea, except with the knife directed in a more oblique manner than it ought to be consistently with the safety of the iris, and even when we have completed the punctuation of the temporal side of the cornea we cannot direct the blade of the knife in a sufficiently horizontal manner to enable us to conduct its point to the opposite side of the cornea without injuriously and difficultly sustaining the cornea upon the instrument, prematurely evacuating the aqueous humor, and stretching, as it were, the muscles of the globe and the optic nerve in the attempts to keep the blade of the knife in the flat horizontal position in which it should be placed. It is unnecessary to enumerate the various accidents to which this state of things will expose the eye of the patient. Such a case is, therefore, unsuited to extraction, and so far, rather adapted to reclination or depression.

---

* WENZEL says "in cases where the cornea is small, I have remarked that the crystalline is constantly large."

I have now enumerated the major part of those circumstances in case of hard lenticular cataract, to which the operation of reclination or depression would be much better adapted than that of extraction: namely, 1. Where the patient is particularly emaciated and feeble, and where, consequently, if the operation of extraction be performed, union of the corneal flap can scarcely be expected to occur; but, in its stead, ulceration, sloughing, and staphyloma of that tunic. 2. Where the cornea is small relatively to the magnitude of the eye-ball, and, as far as we can judge, to the lens. 3. Where the iris from any cause (whether from any morbid adhesion or not) is situated unusually near to the neural surface of the cornea. 4. Where the eye-ball is situated very deeply in the orbit.

With regard to the comparative merits of reclination and depression, I have very little to mention; they are often performed, as far as I can judge, indifferently, or, in other words, without any especial selection of cases for the one in preference to the other, but if a surgeon has satisfied his mind concerning the comparative merits of these two kinds of operation after a due consideration of the subject, I believe he will always adhere to the one or the other according to his decision of their respective value; I mean to say that in those cases of hard cataract where extraction cannot with propriety be performed, he will *always* either perform the operation of depression, or, on the contrary, he will as invariably perform that of reclination; and, as far as my experience has enabled me to determine this question, I think reclination is preferable to depression in the general, and chiefly so because when the lens is reclined it is less liable to rise again or to press upon the retina than where simple depression is performed. When a lens is properly reclined it cannot rise with its broad convex surface upwards (horizontally), it must first push the iris forwards in order that it may disengage itself from the septa of the hyaloid membrane, in which it is imbedded, and from the pressure of the vitreous humor, a great part of which is resting upon that surface of the lens which was formerly directed towards the cornea. But, on the contrary, when the lens is merely depressed, its sharp margin and wedge-like figure are well adapted to enable it to ascend into its original position, and there is much less impediment to its return than in the former instance, where the support of the iris in front, the pressure of the vitreous humor above, and its firm impaction in the septa of the hyaloid membrane, opposed a great variety and combination of obstacles to any change in its situation. In depressing the lens its sharp lower margin may be forced against the retina, but this cannot well happen in reclination—or, to speak more precisely, it will be less likely to happen in the latter than in the former case. Simple depression of the lens, that is, the direct depression of the lens beneath the pupil, is very seldom practised now—it is superseded in a great measure by extraction and reclination.

When the subject of cataract is beyond the age of fifty, or when, being younger than fifty, there is reason to believe that the cataract is of a hard and firm texture; when the health is good; the strength sufficiently great to justify the expectation that union of the corneal flap will take place after it has been divided; when the eye is healthy and not much sunk in the orbit; the intertarsal slit not being unusually small; the cornea large, and the anterior chamber ample, I prefer the operation of extraction to every other; first, because it will occasion less pain; secondly, because it will remove the cataract at once and altogether; and thirdly, because it will injure no deep-seated part, and will not therefore be likely to give rise to any inflammation likely to peril the recovery of vision. A large, hard, opaque lens, an ample cornea and anterior chamber, with a healthy state of the eye in other respects, and not too deeply situated in the orbit, constitute, as far as the eye is concerned, a fit case for extraction, and, if the intertarsal slit be of its usual size, and if the patient possess a due degree of constitutional power, that operation is much better suited to the case than any other. And in every case where there exists a thick tough capsule, a section of the cornea must be made, for, as I shall afterwards explain, we cannot divide or depress such a substance at all easily, and, in some instances, we cannot accomplish it at all by the introduction of a needle within the globe either through the cornea or sclerotica.*

3. WHEN CATARACT EXISTS IN ONE EYE ONLY IS IT ADVISABLE TO ATTEMPT ITS CURE BY MEANS OF A SURGICAL OPERATION SO LONG AS THE VISION OF THE OPPOSITE ORGAN REMAINS UNIMPAIRED?—It has been supposed that the existence of cataract in one eye, has a tendency to induce a similar disease in the opposite organ, and, as the labour of vision is thrown upon one organ in consequence of the incapacity of its fellow, it becomes weakened owing to the undivided labour it is obliged to sustain, just in the same way as an ordinary machine in constant use would be worn out much quicker than a similar machine less frequently and actively employed. Again, when cataract occurs in the eye of a female, it constitutes an odd sort of personal blemish, and they are anxious for its removal although it does not in any way interfere with vision. It is also stated that it communicates a tendency to strabismus—a condition of strabismus which is, however, limited to the cataractous eye. Such is the basis of the arguments usually employed in support of the advantages of an operation for cataract when it exists in one eye only. However, these arguments are only apparently decisive of

---

* For a full inquiry into the merits of the various kinds of operation practised for the cure of cataract, the reader may advantageously refer to the published opinions of POYET, POTT, SHARP, CALLISEN, HEY, RICHTER, SCARPA, WENZEL, AMMON, DUPUYTREN, GUTHRIE, and COOPER.

the question. In the first place, there is no reason whatever to believe that the continuance of cataract in one eye disposes the other to a similar affection, on the contrary, experience presents to us an abundance of instances where a cataract exists in one eye only for a series of years, the opposite organ continuing quite strong and healthy. It is true that after cataract has made a certain degree of progress in one eye it often commences in its fellow, but it would be improper, in the present state of our knowledge, to say that it then began *in consequence of* disease in its fellow, for, until we are far better acquainted than we now are with the circumstances which gave rise to the affection of one lens, we cannot form any decisive opinion respecting the cause of the disease in the other. The same cause, whatever it be, the same circumstances, whatever may be their nature, most probably originated the disease in both. There is also no evidence to prove that when the sight of one eye is destroyed, that of the opposite organ becomes impaired in consequence, nor that strabismus takes place as an effect of the cataractous disease, though certainly an *a priori* view of the matter would lead us to suppose this affection might be so produced. I repeat that after having most carefully perused the observations of those who have announced that when cataract occurs in one eye, amaurosis of the opposite eye is then likely to take place, no satisfactory evidence appears to me to have been brought forward in favour of the statement. Persons who were born with one eye only, persons who in early life have had collapse of one eye-ball after an attack of ophthalmia, persons who are affected with congenital or traumatic amaurosis or cataract, of one eye only, very often retain the sight of the opposite organ to a late period of life with the same degree of perfection as do other individuals whose sight has always been equally good in both. However, the circumstance of personal appearance must be an argument of some weight, especially with young females who are desirous of mixing with the world and of enjoying society, unattended by any personal blemish which art can remove; in such instances our assistance may be required, but old persons and they who prefer to retain a slight personal defect rather than incur the pain and annoyance of its removal by submitting to a surgical operation, will dispense with our services.

There are two important objections to the cure of cataract by an operation when it takes place in one eye only, the opposite eye being perfectly sound and healthy. In the first place, the pain and confinement of an operation must be considered, and, what is more important, the risk of exciting a degree of acute or chronic inflammation which may be detrimental to the sound eye; and secondly, the difference of focus in the two eyes which will exist when one lens only is removed. We know that when the lens is removed from an eye, that eye then becomes far sighted, and the patient is compelled to make use of a double convex glass to enable him to distinguish the objects of his observation with accuracy, but if we remove the lens from one eye only, the focus of the two organs differs very materially, and the patient is condemned to the use of an eye-glass or spectacles for life, in order to obtain a clear and unconfused state of vision. These, then, are two very serious objections to any operation undertaken merely for the purpose of removing a slight personal blemish; for I do not admit that the object of the operation, performed under these circumstances, extends beyond this.*

---

* WATHEN, WARNER, CALLISEN, RICHTER, and SABATIER, have expressed opinions, respecting the propriety of operating for cataract when it exists only in one eye, pretty similar to those stated in the text.

4. WHAT IS THE DESCRIPTION OF TREATMENT IT MAY BE ADVISABLE TO ADOPT, IN THE GENERAL, PREPARATORY AND IMMEDIATELY ANTECEDENT TO, THE PERFORMANCE OF AN OPERATION FOR THE CURE OF CATARACT?—There are many surgeons who consider it quite unnecessary to subject their patients to any medical treatment whatever prior to the performance of an operation for the cure of cataract, but I am persuaded many failures are to be referred entirely to this unwarrantable neglect.* The effect to be chiefly dreaded, after an operation of this description, is inflammation, and it is, therefore, of decided importance to make use of every measure calculated to obviate its occurrence or diminish its severity. Now, if the patient be of a strong plethoric habit, if the face be red and veined, and indicate an undue fulness of the circulating system, you would direct him to be cupped or bled in the arm, to live upon a moderate and reduced diet, and to abstain altogether from meat and from the use of strong liquors, for at least a week immediately antecedent to the operation. If there be any feverish disturbance of the system, it would be right to ascertain its cause and remove it, if possible, or at least mitigate it, before performing an operation for the cure of cataract. If the tongue be foul, the breath fetid, and, if the patient complain of pain in the head and loss of appetite, it would be right to have recourse to those purgative and other remedies the particular circumstances of the case may require; undoubtedly it is most important to the success of an operation for cataract that the patient's bowels

---

* After having described the severe symptoms which succeeded an operation for cataract by HILMER, M. HOIN proceeds to remark, "le malade étoit d'un tempéramment sec, il avoit été opéré sans aucune préparation; et c'est assez la méthode des oculistes non sédentaires." *Mém. de l'académie royale de chirurgie.* Tom. ii. p. 426.

should be in good order, and his alimentary canal in a tolerably healthy state. It would be necessary to tranquillize the system of the nervous and irritable, to reduce the vascular plenitude of the strong and plethoric, and to rectify, as far as practicable, the derangements of the alimentary canal, prior to the performance of an operation for the cure of cataract. If gout or rheumatism be somewhat periodical in their occurrence, every prudent surgeon would, of course, be particular not to operate at the time they usually take place, and would be careful besides not to operate when that weather prevails which is favourable to the commencement, the maintenance, and the aggravation of either the one or the other of these maladies. Such are the principles to be kept in view in conducting the preparatory treatment, and I need not enter into details.[*]

The patient may suffer from some defect, which, although very little mischievous to an eye in a healthy state, may exercise an extremely pernicious influence upon that organ when rendered irritable by the performance of an operation, unless such mal-condition be previously rectified: such, for instance, as trichiasis, entropium, tinea, a tumour in the eye-lid or at the tarsal margin, chronic ophthalmia, and many other maladies of a similar kind; and, of course, every well-informed surgeon would take care to remove all such defects before he attempted an operation for the cure of the more important disease. The effects of the constant closure of the lids, and of that spasmodic state of the orbicularis palpebrarum which often exists after the extraction of the lens, disposes to trichiasis and incurvation of the tarsal cartilage, so that, in some instances, although only a very slight degree of entropium existed before the performance of an operation, it has been present in a most aggravated form in a short time afterwards; in short, few circumstances are much more favourable to the production of trichiasis and entropium than the occurrence of that condition of things which is connected with the state of a patient's eye after an operation for the extraction of the lens. If, therefore, there be the slightest disposition to either of these diseases (trichiasis and entropium,) if, indeed, merely a considerable laxity or superabundance of the palpebral integuments were present, it would be well to perform any operation the particular defect may require for its cure, prior to the extraction of the lens. When these views are properly explained to the patient, when he is apprised that the success of an operation for cataract depends to a certain extent on the prior removal of a lesser defect by a slight operation, he will not refuse to accede to its performance, unless, indeed, he be more indifferent about the restoration of his sight than persons generally are found to be. Many other defects to which I have not referred by name may exist, and, in as far as they are likely to interfere with the successful result of an operation for cataract, they ought to be removed, if practicable, whatever may be their nature; but some of these defects do not admit of removal, and others it might be hazardous or improper to remove, and it then becomes a question for consideration, how far it is desirable to perform any operation for the cure of the cataractous disease. Are the chances of success still sufficiently great to justify the attempt? Questions of this nature occasionally arise in particular cases, but they are perfectly anomalous and cannot be provided for by any rules to be laid down by an author or lecturer—they must be determined by the professional acumen and knowledge of the surgeon under whose care they may fall.

---

[*] I have known the administration of an emetic (which has been employed as part of the preparatory plan of treatment) effect the cure of cataract, by inducing the rupture of the anterior capsule of the lens in the violent efforts of vomiting. Such an event is, of course, an extremely rare occurrence, and is more likely to cause destructive inflammation of the eye than to accomplish the restoration of vision.

Gouty individuals and persons suffering from various forms of constitutional disease, may be the subjects of cataract, and may desire to undergo an operation for its cure, and there can be no decided objection to the performance of one when you have *worked* their system into as favourable a state for the operation as possible, and have explained to them or to their friends the much greater hazards which exist in their cases, compared with those of other persons, of the occurrence of disorganizing inflammation, and their consequent diminished chances of the recovery of vision. It would not be right to say to such persons, who may be desirous of being implicitly guided by their surgeon's advise, "you must still remain blind, lest after having undergone the pain of an operation, inflammation should arise and your vision be thereby destroyed;" for, even if this do occur, if the worst part of the apprehension be realized, the patient cannot easily be more blind than he was before the operation, and he may possibly obtain a very useful degree of vision. I have already mentioned, that it would not be advisable to operate about the time when former experience had led the patient to expect an attack of gout, and that it would be absolutely necessary to select, with especial care, clear fine weather, as the period to perform the operation.*

---

* A few years ago I assisted a professional friend to perform the operation of extraction upon the left eye of a well-known physician, formerly residing at Burton. The operation was very correctly performed, and the after-treatment conducted with the greatest possible care; but, in consequence of the occurrence of arthritic inflammation, vision was completely destroyed. This gentleman had been for many years, to use a familiar phrase, "a martyr to gout." I have repeatedly operated for cataract upon very gouty persons with pretty uniform success. My plan is to place an issue in the arm about a week prior

5. RESULT OF CATARACT OPERATIONS.—Many statements have been published respecting the result of particular operations performed for the cure of cataract, but I am the less disposed to draw any decided conclusions from them which would induce me to give an invariable and restricted preference to any one mode of operation, from an acquaintance with the extent to which success is influenced by the skilfulness and dexterity of the operator, by the proper adaptation of the operation, and by the prior and after management of cases.*

I shall now very briefly introduce a few of the many published results of various operations performed for the cure of cataract, only remarking that as different kinds of cataract require to be removed by different operations—require the adaptation of an operation to their particular circumstances—it is quite impossible to draw any precise conclusions, with regard to the positive advantages of any one method hitherto proposed, unless the circumstances of the cases, (which are merely presented in general numbers) were more minutely described. I speak gene-

---

to the operation, to select proper weather for the operation, and to take care that no "fit of the gout" is expected to occur, as far as the patient's experience can determine the matter, about the time of operation. And, finally, I conceive it to be very important to operate upon both eyes; for, if one eye only be operated upon on the same day, and the other a few months afterwards, I have pretty commonly observed that the operation does not succeed in either of them. If each eye is operated upon on the same day, the worst that has ever occurred in my own practice, has been the loss of one of them—the disease has appeared to be satisfied with the destruction of one organ, and to that it has, in a great measure, directed and limited its virulence and concentrated its force.

* I agree with MR. GUTHRIE that in cases suited to the operation of extraction (not further to extend my remarks on the results of this single mode of operation) a skilful operator need "only expect a total failure as a matter of accident; rather as an untoward circumstance which may occur, than as one which is likely to occur." *On the extraction of cataract, &c.* London, 1834, page 7.

rally, when I assert, that (whatever may be the merits of the operations he rejects) a surgeon will derive the greatest measure of success from that operation which he most frequently practises and to which he more particularly directs his attention; and in making this statement, I am, of course, presuming that the operation consist of one of the four generally admitted modes of causing the removal of cataract—namely, by *solution*, *extraction*, *depression*, or *reclination*.

1. "Des six cataractes abattues par M. MORAND à la méthode ordinaire, trois out réussi et les malades voient bien; trois ont remontées. Des six malades de M. la FAYE opérés par l'extraction du crystallin, il y en a deux qui voient bien, deux voient bien moins, deux n'y voient point. Des sept opérés par M. POYET, deux voient bien, deux moins bien, un voit le jour seulement, et deux n'y voient point du tout."*

2. "Depuis ce tems, j'ai continué de la pratiquer en différens endroits, et je compte jusqu' aujourd'hui 16 Novembre, 1752, deux cens six opérations, dont cent quartre-vingt-deux ont réussi."†

3 "M. ROUX is an advocate for the method of curing cataract by extraction, and states that out of six hundred and sixty operations performed by him, for the most part on hospital patients, four hundred have been attended with success. The committee, in their report on this paper, state that, out of sixty-five operations performed at the Hôtel-Dieu by the method of depression, forty-eight have completely succeeded."‡

---

* *Mémoires de l'académie royale de chirurgie.* Tome ii. p. 583.

† See the remarks of DAVIEL (in the work just quoted, p. 344) "Sur une nouvelle méthode de guérir la cataracte par l'extraction du crystallin."

‡ *London Medical and Physical Journal.* (Article. "Royal Academy of Sciences at Paris."—Jan. 5, 1818.) Vol. 39, p. 515.

4. "In the operation of hyalonyxis, admitting the case of the gentleman, who exposed himself too early after the operation, to have been completely unsuccessful, the loss is only one in twenty-six; or, in other words, in one hundred and sixty cases, one hundred and fifty-four were restored to sight by the operation, and ultimately succeeded."*

5. "DR. TARTRA has published the results of the operations for cataract, performed in the Hôtel-Dieu, at Paris, from the commencement of 1806 to 1810, inclusively. The total number of cases was one hundred and thirteen, seventy of which were extracted, and forty-three displaced. Nineteen of the seventy extractions, and twenty-four of the forty-three displacements, were successful; six extractions, and four displacements, were followed by partial success; eight extractions, and five displacements, were total failures; and the results of the rest were either unknown, or more or less unfavourable."†

6. "A table is given of the result of twenty-one operations by keratonyxis, seventeen of which were successful."‡

I find, on referring to my *case-book*, that of the last seventeen operations for extraction I have performed at the infirmary and in private practice, I have not failed in a single instance to restore vision, and, for the most part, a degree of vision, adequate to the purposes of ordinary reading and writing.§

---

* *Practical Observations on the removal of every species and variety of cataract, by hyalonyxis, or vitreous operation.* By JOHN BOWEN, M.D. London, 1824. P. 118.

† *A Practical Treatise on the Diseases of the Eye.* By WILLIAM MACKENZIE. London, 1830. P. 578.

‡ Review of DUPUYTREN's *Leçons orales de clinique chirurgicale, faites à l'Hôtel-Dieu de Paris,* in *Medico-chirurgical Review,* for April, 1833.

§ In one instance only has there appeared to be any threatening risk of the loss of vision. This took place in the case of MR. LEE, of Sutton,

6. AT WHAT SEASON OF THE YEAR SHOULD CATARACT OPERATIONS BE PERFORMED?—I do not find that it is of much importance at what season of the year we operate for the cure of cataract, provided the subject of the operation be in a good state of health; but certainly if we operate in very cold weather the patient is apt to sit very near to a bright warm fire afterwards, and in this manner the eye may become inflamed and injured. Some of the old writers on diseases of the eye have given very particular directions upon this subject, they selected the state of the weather with great care and caution, and the ingenious BANISTER even thought the matter of sufficient importance to be the theme of his poetical talents—his usual mode of treating those parts of his subject which he conceived to be entitled to especial consideration.* DIONIS remarks

---

upon whom I operated (in the presence of my friends MR. WOOD and MR. WICKENDEN) about seven months ago. This patient was remarkably restless during the first night after the operation, although he was not suffering from much pain or uneasiness, and, on visiting him the following morning, I found one eye completely uncovered, and the roller I had placed over the thin linen pad was reduced to a mere string and was turned, in an oblique direction, across the other eye. The consequence of this untoward state of things was exactly as I expected—namely, severe inflammation, which caused suppuration of one eye and closure of the pupil in the other. After the inflammation had entirely subsided I performed an operation for artificial pupil, and the gentleman can now see sufficiently well to manage a small farm, and read large type without difficulty.

* I shall quote one of his amusing stanza's respecting "the fit time for couch of cataracts."

"Couch cataracts upon
A day so faire,
That neither wind nor
Clouds disturbe the ayre,
When spring with smiles
Fils the earth's rich lap,
Or autumne makes
The tree put off his cap,
The moon i'th' full,
Or in conjunction sly,
Or tracing Aries,
Or in Gemini."

upon the same point, "avant l'opération, la prémiere chose à quoi on doit songer, c'est de choiser le tems, car elle nous permet celui d'élection, la nécessitè n'étant point pressante, on a coutume de la remetre au printems, on à l'automne, et au déclin de la lune."[*]

"Le choix de la saison n'est pas indifférent: l'hiver, les temps froids et humides exposent trop au rhume, pour courir le danger des sécousses perpétuelles que peut causer une toux fréquente. Ce serait également une grande imprudence de choisir pour cette opération des saisons où règnent des épidémies catarrhales."[†]

"It is necessary, as much as possible, to avoid very hot weather; because patients are in general obliged to keep in bed afterwards."[‡]

It is well known that the experienced DUPUYTREN paid great attention to the state of the weather, when about to undertake an operation for cataract. His opinions, as contained in his *Leçons Orales*, are entitled to the most respectful attention.

### SECTION X.—OPERATIONS FOR THE CURE OF CATARACT.

The operations for the cure of cataract are usually divided into those anterior to the iris, and those posterior to the iris. The first of these divisions comprehends the operation of extraction and keratonyxis, which latter mode includes the anterior operation of solution, and also depression and reclination as they are sometimes performed. The second class includes the posterior operation of solution or absorption, and depression and reclination, as they are more usually performed. I do not profess to speak of the many other operations for the cure of cataract which have been suggested, eulogized, practised, and—abandoned.

---

[*] *Cours d'operations de chirurgie.* Paris, 1750, p. 550.

[†] DELPECH in *Dictionaire des sciences médicales.* Tome iv. p. 305.

[‡] See WARE's translation of WENZEL's *Treatise on the Cataract.* London, 1812, page 60.

### 1. EXTRACTION.

*Is it advisable to operate upon both eyes at the same sitting?*—Some operators prefer to remove the lens from each eye at the same time; they say the eyes are thus rendered similar in appearance and alike in focal power, that the patient suffers but one attack of inflammation and one period of confinement, with other reasons less significant than these; but there are also disadvantages which, it is generally stated, are connected with this method; and 1, the eyes are subject to participate in any untoward condition of the system which may occur after the operation has been performed; 2, if the inflammation be very severe in one eye it will be likely to increase that in the other; 3, a double injury is inflicted and, *cæteris paribus*, acute inflammation will be more likely to arise when each cornea is incised than when one only is divided. Among the advantages of operating upon one eye only at first, it may be stated that if the patient loses the sight of that eye the other still remains, and the surgeon frequently derives a hint from the loss of the first which may assist his after efforts in attempting to preserve the sight of the second—he may perhaps discover some error of the system which may injuriously influence the state of the eye after the injury inflicted by the operation, which error may be amended or removed before a second operation is undertaken.

And again, inasmuch as the sight of one eye is as useful to the patient as both, or at least as the difference as respects utility is very trifling, it is also on this account—

from a mere wish to save him a certain amount of pain—desirable to operate only upon one eye. However, the question is not one of very great moment in deciding the success or otherwise of the operation of extraction, for I have heard many surgeons remark, who have had an unusually great extent of experience in these matters, that having, without any express selection of cases, operated upon one eye alone during the course of one year, and upon both (at the same sitting) during another year, they are unable to give a preference to either the one or other practice founded merely on the fact of their comparative degrees of success, as evinced by these trials of their respective merits.*

*Preparation of the eye for operation.*—Before performing an operation for extraction it is right to obtain the enlargement of the pupil as far as possible, and this is most advantageously accomplished by the application of belladonna to the eye-brow, on the evening prior to, and the morning of, the day of operation. This is much better than dropping the solution of belladonna into the eyes, which has a tendency to render them irritable, and sometimes, in spite of every precaution, a little of the belladonna solution (which cannot be filtered so finely as to remove every particle of the undissolved extract) will remain in the folds of the conjunctiva, and it is just possible that it may enter the cavity of the eye on the completion of the corneal section, and, at all events, its lodgment on the surface of the eye will give rise to irritation. The advantages resulting from the dilatation of the pupil are sufficiently evident—namely, to diminish the risk of wounding the iris, and to enable us to pass the cataract knife with greater certainty and celerity across the anterior chamber. It may be preferred to use the stramonium for the purpose of dilating the pupil, and it is well known that all narcotics have a tendency to produce its enlargement. When the pupil is ascertained to be small, early on the morning of the operation, I am in the habit of recommending that a strong solution of the extract (one drachm to an ounce of water) of hyoscyamus be dropped into the eyes, as suggested by Himley and Wishart. By the agency of these drops the pupil is enlarged to a very great extent, without exciting any approach to that amount of pain which sometimes follows the use of the belladonna drops.

---

* I am now in the habit of operating upon both eyes at the same time, persuaded that where one eye only is much used, after the operation of cataract, by the aid of the glass it is necessary to employ, under such circumstances, for the purposes of reading and writing, it is very prone to become amaurotic, or to undergo some subsequent change by which vision is more or less seriously impaired. And besides, I do not find that old people, in particular, like to undergo, or indeed can bear, without sustaining a good deal of injury, a second confinement, and to undergo a second time the treatment necessary to be adopted after an operation for cataract. And further, when persons are subject to gout or rheumatism, I invariably prefer to operate upon both eyes at the same sitting, for reasons stated at page 121.

*Characters and qualities of a good cataract knife.*—I cannot enter minutely into a disquisition respecting the comparative merits of the variously formed knives invented and employed by different operators with a success which, (from the very opposite forms and characters of the instruments employed) leads me to the conclusion that a very great deal depends on the skill with which they are used.* The temper of the steel of which it is made should be such as to avoid any great liability to fracture, and, at the same time, such as to permit it to receive a very fine, sharp, and smoothly-cutting edge. Its blade is usually rather more than an inch in length; if it be longer, we have not sufficient command over its point; if shorter, it will not cut its way out, (without a downward section, which it is always desirable to avoid) at least not unless it be much broader in that part of its blade towards its handle, than is consistent with its easy passage through the cornea. Its apex should be fine and sharp, and in order that it may the more easily penetrate the cornea, it should cut, for a very short distance from its point, at both its edges. The sharp angles at the sides of its upper horizontal margin should be rounded off, and it should be so made as very gradually and perfectly to increase in thickness as it recedes from its point, so that it may accurately fill the opening in the cornea as the division of that tunic proceeds to its completion. In several of my earlier operations I have remarked that as soon as the point of the knife has arrived at the *concave surface* of the *nasal side* of the cornea, it has bent backwards; instead of transfixing the cornea its point has curved towards the retina, and this has happened from the too great delicacy of the point of the blade. I have the knife I now use made sufficiently firm to prevent the occurrence of this most unpleasant and troublesome accident. Until I had arranged my opinions respecting this defect in the formation of the cataract knife, I was not aware that the inconvenience occasioned by it had been mentioned by any writer on the extraction of cataract, but I have since discovered that the same defect in the construction of the instrument has been pointed out by RICHTER, and more particularly insisted on by the anonymous translator of his excellent *Treatise on cataract.*

---

* "The knife I prefer," says Mr. Guthrie, "is spear-pointed, and blunt on the back: the width depends on the maker, my rule being that it shall be as broad as the perfection of the point will admit, and the artist finds that he cannot put the best point on a broad instrument, so that it is essentially rather a narrow knife."—There is a delineation of various cataract knives (comprising those of Daviel, La Faye, Pellier, Richter, Beranger, Simon, Wenzel, Jaeger, Sharp, Warner, Arneman, Bischoff, Guthrie, Scarpa, and Beer) in the works of Heister, B. Bell, Wenzel, Warner, Sharp, Frick, Demours, Scarpa, Guthrie and also in the second volume of the *Memoirs of the Royal Academy of Surgery*, and the tenth volume of the *London Medical and Physical Journal.*

*Arrangement of the patient.*—The individual about to undergo an operation for cataract is usually placed on a chair with a sliding back, which supports the head and prevents it in a great measure from receding during the progress of the operation.* But there are two important objections to this position—this mode of arranging the patient. In the first place, the head is not kept absolutely and fixedly steady; and, in the second place, the arm and elbow of the operator are insufficiently supported; and further, syncope may occur, and prevent the completion of the operation, an accident which may always be avoided if the patient be placed in a recumbent position. DUPUYTREN says such an accident took place twice in the practice of M. HUSSON.† If the patient is placed in the recumbent posture the head is, of course, prevented from receding, and the operator can rest his elbow upon the table, support his arm upon the patient's chest, and his hand upon his cheek, and thus much better secure the steadiness of the hand than in the former instance. It is desirable so to place the patient that the light shall not fall directly upon the centre of the cornea, for its reflection will then obscure the clearness of the view of the point of the knife in its passage across the anterior chamber. The face (presuming the left eye to be the one selected for operation and the lower section to be practised) should be a little inclined to the right side of the body, and the head and shoulders should be slightly elevated. The next step consists in passing a roller or some light bandage upon the lids of the eye upon which it is not at present intended to operate, for, unless this precaution be taken, the opposite eye will, in obedience to the sympathy existing between their muscular movements, roll about very powerfully and inconveniently, and be much more unsteady than it would be if this method were not adopted.

---

* There is a representation of an operating chair of this kind in BISCHOFF'S *Treatise on the extraction of cataract.* Table 1.

† The distinguished Baron placed his patients in bed before proceeding to operate upon them for cataract. The recumbent position appears to have been preferred by MR. WARE. "It appears to me," says he, "that the surgeon will perform the operation with more composure if the patient be laid on a table, than if he be seated in a chair; but, except in infants, this is not indispensable, if the patient's steadiness can be depended upon." (P. 372.)

*The operation.—Division of the cornea.*—If about to operate upon the left eye, direct an assistant to raise the upper-lid with the index and middle finger of the right hand, and to press it firmly against the upper orbital ridge, so as to expose extensively, without pressing upon, the globe, so that any pressure it may be necessary to employ (and which is only permissible until the punctuation of the cornea is completed) in order to steady the globe, is most advantageously afforded by the fingers of the operator himself. Many surgeons object to pressure altogether, they think it has the effect of promoting the escape of the aqueous humor, the prolapse of the iris, the rupture of the capsule, and the premature dislocation of the lens; but when applied with judgment and moderation, at this very early period of the operation, it is very serviceable in preventing that inversion of the eye-ball, (by which the cornea is so completely thrust towards the nose as to be scarcely visible) which is so apt to occur and perplex the operator unless counteracted by the means I have just mentioned. However, this pressure, made with a view of steadying the eye-ball, is not necessary after the punctuation of the cornea is completed. Some surgeons prefer to dispense with the services of an assistant, and raise the upper-lid and fix the eye-ball themselves, or they do not think it necessary to have the superior palpebra raised at all; and this I have done on several occasions in the absence of an assistant upon whose tact and knowledge I could rely. I shall assume for my present purpose that the upper lid has been raised, as I have described, by a proper assistant. The operator having depressed the lower lid by means of the index and middle fingers of the left hand, (the former of which is placed towards its inner, and the latter towards its outer canthus, with sufficient firmness greatly to limit, or entirely prevent, the rolling motion of the eye-ball,) takes hold of the cataract knife with the first and second fingers of the right hand, which are not extended, but curved, so as to admit of the propulsion of the knife towards the inner canthus at an after part of the operation by means of this extension, without a movement of the whole hand—I mean to say that the cataract knife is propelled through the cornea and towards the inner canthus simply by the *extension of the fingers*. The point of the knife is directed somewhat obliquely (as though it were intended to transfix the opposite pupillary edge of the iris, when the pupil is in a mid state between extreme contraction and great dilatation) and the cornea pierced at about the fourth of a line from its margin and a very little above its horizontal diameter. Having completed the punctuation of the cornea at its temporal side, the flat surface of the knife is directed by an almost insensible movement of the fingers parallel with the plane of the iris,* and its point conducted across the anterior chamber simply by the extension of the fingers, and the apex of the cataract knife is brought out at the opposite side of the cornea as near to its junction with the sclerotica as that at which it entered on its temporal side, until the incision is completed; until, to use the customary phrase, "it cuts its way out." Now, in order that this may be accomplished, the blade of the knife must gradually increase in breadth and thickness from its point towards its heel, for, unless a knife of this form be employed, the aqueous humor will very probably escape prior to the completion of the section, and the iris will, consequently, be exposed to great risk of injury. The triangular knife of BEER, so commonly employed by surgeons at the present time, is so formed; its point is sharp and delicately fine, it becomes gradually broader and thicker as it recedes from its apex, and, when well made and properly used in a suitable and favourable case, and upon a tranquil patient, the opening in the cornea may be so perfectly filled by it that the aqueous humor cannot escape until the punctuation of the cornea is completed.

---

* MR. GUTHRIE denies that surgeons actually give this slightly inclined direction to the point of the cataract knife whilst making the punctuation of the temporal side of the cornea. He says, "the gentlemen who think they do as they say, are, I believe, mistaken; and when they do, they do nothing but mischief." See *Pamphlet*, p. 17.

This, then, completes the first stage of the operation, that is, the division of the cornea; and when properly performed, the boundary of the corneal flap comprehends, as nearly as possible, one half of the cornea, which extent of incision is generally necessary to permit the free transit of the lens. The laceration of the capsule and the removal of the lens constitute the two other stages into which this operation is usually divided.

*Laceration of the capsule.*—Having finished the section of the cornea direct an assistant to close the lids gently but promptly, in order to lessen as much as possible the tendency to contraction of the pupil, and quiet the irritability of the muscles of the globe. If the light be permitted to have free access to the eye immediately after the operation, the pupil will become extremely contracted, the muscles of the eye-ball excessively irritable, and the iris may consequently be lacerated, unless the lens be very gradually protruded or most carefully withdrawn; and besides, a neglect to exclude the light at this period will be singularly favourable to the occurrence of severe inflammation. If any spasmodic action of the muscles of the globe, of the eye-lids, or of the face, take place, rub the palpebræ and cheek gently with the hand—slight friction of the lids and the cheek has a very tranquillising effect upon their muscles under these circumstances. On the subsidence of this irritability direct the assistant to raise the upper lid as before and to avoid all pressure upon the eye-ball, and, if the lens do not advance, pass the sharp curved end of the curette, beneath the corneal flap, with its convexity directed upwards, and, as soon as its point has passed opposite the pupil, direct it backwards, and freely lacerate the capsule by drawing the point of the instrument in various directions; this manœuvre requires no force, for, a mere scratch, the slightest touch imaginable, will be sufficient for the purpose unless the capsule be morbidly thick and tough; having freely lacerated the capsule, withdraw the instrument in a direction precisely the reverse of that in which it was introduced; a precaution employed in order to prevent its point from hitching in either the iris or the cornea. It may happen that the moment the sharp point of the curette is introduced beneath the corneal flap, the muscles of the eye-ball may become irritable, and threaten the sudden and forcible propulsion of the lens through the opening. If such were the case it would be necessary, absolutely necessary, to withdraw the instrument, close the eye-lids, and by gentle friction of the face and palpebræ attempt to tranquillize the muscular irritability. There is, however, generally present, a certain measure of muscular twitching—a sort of unsteadiness or irregular quivering, rather than distinct spasm—and it is quite impossible to mark the precise boundary line which constitutes the point at which it would be necessary to withdraw the curette, or safe to persevere in its introduction and use.

*Removal of the lens.*—As soon as the capsule is freely lacerated carefully close the eye-lids and employ gentle friction upon their surface, then, having the upper-lid cautiously and properly raised, gently press the grooved end of the curette upon the upper part of the eye-ball (I am speaking of the lower section) at a little distance behind the margin of the cornea. If the lower margin of the lens appear disposed to come forward, merely maintain the same slight degree of pressure first employed, lest, if more force be used, the lens should suddenly jerk forward and lacerate or paralyze the iris; but if no such disposition to protrusion were evinced—if the lens did not at all advance—it would be advisable to increase very gradually, and also slightly vary, the degree of pressure, and, if it still remain, the capsule may be again lacerated, and pressure upon the globe employed; for, it is possible, that the lens may be detained in its situation by the imperfect laceration of the capsule. If the lens do not then advance, and if as much pressure has been made use of as it is deemed prudent to employ without much injuring, or hazarding the serious injury of, the deep-seated textures, a fine hook may then be introduced beneath the corneal flap with its point directed towards the lower margin of the cornea, and having fixed it firmly in the substance of the lens, draw it gently and slowly through the pupil. It will sometimes happen that the hyaloid membrane with its contained humor will bulge towards the corneal incision, at the same time that the lower edge of the lens, instead of approaching and passing between its lips, is lifted forwards and upwards, and if pressure of the eye-ball be then employed, it will cause, not the protrusion of the lens, but the escape of the vitreous humor. I have seen surgeons attempt to *force out* the lens by means of great pressure upon the globe, they have, however, *forced in* the sclerotica for a considerable depth, and when they have removed the curette there has remained a considerable groove just where that instrument has been applied, and they have usually been compelled to withdraw the lens by means of the small hook, after having employed this forcible compression in vain. I need scarcely remark that great pain and severe inflammation are excited by such harsh and violent practices. The lens may retire into the vitreous humor, (the septa of which may be absorbed) and the surgeon may not be able to remove it without employing an undue degree of force, and inflicting an unwarrantable amount of injury, and in such a case it should be suffered to remain, after having used a proper degree of effort to withdraw it. A case of this kind occurred under my own observation not long ago, a surgeon was anxious to remove the lens which retired to the back part of the eye, he said "it must be fished out," and he made many attempts to hook it, but in vain, his hook sometimes caught in the retina, as I suppose, and sometimes also in the lens, but he could not withdraw it; I strongly advised him to let it remain, but he persevered for a very great length of time, until, in fact, he contrived to pull the cataract through the opening in the cornea. This was satisfactory enough to him, no doubt, for he had *something* to show the patient's friends which they were anxiously waiting to see, but it was bad practice, and, as I expected, the eye inflamed and afterwards suppurated, and, of course, the patient's vision was destroyed. In cases of this description it would be far better to request the patient to lean forwards so that we may obtain the advantages resulting from the gravitation of the lens towards the pupil. At all events, if, on attempting to withdraw the lens it retires within the eye, if a portion of the vitreous humor has escaped, if on pressing the globe the lens does not advance, and if moderate efforts to hook the lens and lift it from the bottom of the eye, have been made, it would be more desirable to leave it behind and to close and bandage the eye, rather than by longer and more persevering attempts endanger, or rather render very probable, the occurrence of suppuration of the eye-ball. Again, the globe may be remarkably tense and full after the extraction of the lens, and, under such circumstances, it would be right to puncture the hyaloid membrane and discharge a portion of the vitreous humor. The severely mischievous effects formerly apprehended from a loss of part of the vitreous humor were very needlessly feared and always much exaggerated; a great portion of it, indeed, at least two thirds of it, may escape during the performance of this operation and the eye may not be materially collapsed afterwards—it will be quickly plumped up again and will speedily reassume its former rotundity, and vision will not be at all injured by the accident.

We may be enabled to remove *nearly the whole* of the lens and its capsule, but *some* of the fragments of each may remain and may baffle the efforts to withdraw them, and if, after having carefully introduced the grooved end of the curette and endeavoured to scoop them away, or rubbed the surface of the cornea gently with that instrument, they still remain, it would not be proper to make any further attempt; they will generally become absorbed, and even if they should not, they will do less injury by remaining than would be sustained by a protracted attempt to remove them. It is not uncommon for the comparatively soft surface of the lens to be rubbed off as the cataract is passing through the opening in the cornea and particularly if the flap be smaller than usual, and I have to repeat that if this portion of the cataract cannot be readily removed, it would be better to allow it to remain rather than employ any prolonged efforts to remove it.[*]

After having removed the lens from the eye, the pupil has not, in two or three instances which have come under my observation, been quite clear, but there has appeared to be a slightly convex and irregularly opaque membrane projecting somewhat through that aperture. In such instances I am satisfied that the posterior capsule remains, and that it is pushed forwards by the hyaloid membrane, which is also opaque, and the contents of which are increased by the existence of a slight degree of glaucoma. The part projects in consequence of the lessened plenitude of, and diminished resistance at, the front part of the eye, occasioned by the division of the cornea and the evacuation of the aqueous and crystalline humors. In every such instance I have found it absolutely essential to the successful result of the case to lacerate the posterior capsule and hyaloid membrane, and permit the escape of a portion of the vitreous humor.

Such, then, is a brief description of the three stages into which the operation of extraction is usually divided, and we will now for a moment review the various steps of the operation, and afterwards consider the accidents which may attend or succeed its performance.

---

[*] Surgeons generally appear to me to be too fond of *faddling* with the eye after an operation for extraction and before they dress it up, and I think much of the subsequent inflammation is frequently owing to this circumstance. The operation cannot be too quickly performed, and the eye cannot be too speedily secluded from the light.

*Review of the various steps and stages of the operation.*—If the point of the knife be directed in too horizontal a manner, it may pierce a portion of the lamellæ only, and may glide between them for some distance, and this error will very likely lead either to extensive opacity or sloughing of that tunic. Again, if it be directed in too perpendicular a manner it may actually transfix the iris, or if it do not, the abrupt turning of the knife in order to render its flat side parallel with the plane of the iris will either bruise the divided edges of the cornea or so open the wound as to cause the evacuation of the aqueous humor; if the blade of the knife be not kept in such a position as that its flat side shall be parallel with the plane of the iris, the aqueous humor will also be prematurely discharged. When the aqueous humor has escaped before the nasal punctuation of the cornea is completed, the iris will bulge forward and will fall beneath the edge of the knife in such a manner that, in the surgeon's attempts to complete the operation without withdrawing it, a portion of that membrane will, very probably, be either severed or sliced completely off; in such a case, therefore, it would be prudent to withdraw the knife and not to proceed with the operation but to allow the opening to close, and at some future time to renew the attempt. However, this opinion is not I believe generally acted upon; perhaps because it is considered to be disadvantageous to the surgeon's skill and reputation, by rendering his failure evident, and many surgeons complete an operation so commenced with the cornea knife —a barbarous mode of completing it, it must be admitted, for the opening in the cornea can only be enlarged to a sufficient extent to permit the extraction of the lens, by repeated incisions; the cornea is in this way haggled and irregularly divided in a rough and unsurgeonlike manner. But the aqueous humor may not be discharged until the punctuation of the cornea on each side is completed, and if the iris then fall beneath the edge of the knife the operator may pause and rub the finger nail very carefully and gently upon the cornea, as was first (and the suggestion is an exceedingly valuable one) advised by WENZEL, and it will gradually recede so as to allow him to push the knife a little more towards the nose, and if he can accomplish this it will not trouble him afterwards, for the increasing breadth of the knife will occupy more room, and will consequently diminish the amplitude of that space in which the falling of the iris forward took place; that is, between the cutting margin of the knife and the lower boundary of the anterior chamber. If the incision of the cornea be made at too great distance from its margin, the section will be too small to permit the uninjurious passage of the lens, and the opacity which sometimes succeeds the division of that tunic will be much more likely to interfere with vision than if the section had been made in the usual situation.* Now, if the incision be too small to permit the passage of the lens in its entire state, the edges of the wound will be bruised, and you will be compelled to remove the cataract piecemeal, after having inflicted great injury upon the iris; and, if the section of the cornea be too large, there will be an increased risk of many mischievous occurrences—namely, of prolapse of the iris; of the escape of a considerable portion of the vitreous humor; of staphyloma of the cornea; and lastly, of sloughing of the cornea from the too extensive deprivation of its natural vital connexions. And finally, if the eye-ball be too suddenly and forcibly compressed with the curette, the lens, instead of being gently and gradually tilted over the lower loose border of the iris, will be suddenly and rapidly projected through the pupil, and will be very likely to lacerate or paralyse its fibres. I have seen the lens dart through the pupil as soon as the incision of the cornea has been completed, (and particularly where the operator has made the section very rapidly) and the knife has jerked out, as it were, from the part it has just divided;* in order to avoid this I am in the habit of pushing the knife slightly forwards and backwards with a sawing kind of motion as soon as I have completed the punctuation of the cornea and have finished the section with the exception of a small portion at its lower part. In this way, the accident to which I have just referred, namely, the sudden jerk of the knife and the rapid propulsion of the lens, may, in a majority of instances, be prevented. It has been recommended [it was the constant practice of MR. PHIPPS, and is now the occasional practice of MR. GUTHRIE] to complete the punctuation of both sides of the cornea with the triangular knife of BEER, and afterwards to divide the small portion which should be suffered to remain, by introducing the cornea-knife through the opening in the temporal and nasal side of the cornea.† I am persuaded that there is no good reason for thus lengthening and dividing the operation.

---

* It has, however, been recommended by MR. WARDROP to divide the lower part of the cornea at a certain distance from its union with the sclerotica, as a means of supporting the iris, and of lessening its liability to become prolapsed and to produce an irregularity in the form of the pupil. See *Edinburgh Medical and Surgical Journal*, Vol. v. page 1.

* MR. ABERNETHY supposed this rapid propulsion of the lens to be customary if not absolutely inevitable, as I imagine, for, he says, in his lectures, "after the division of the cornea, the least sort of pressure will cause the solid lens to *spring out*, which you may *catch in a bottle*."

† DAVIEL and SIGWART finished this part of the operation with a small pair of scissors instead of using a cornea-knife.

*Division of the upper half of the cornea.*—Instead of dividing the lower half of the cornea, some surgeons prefer to divide its upper portion, and all the preceding observations apply to the latter mode of operating, except that the operator must raise the upper lid, and direct the cutting edge of the knife upwards, and reverse the situation in which the requisite degree of pressure may be made with the curette for the purpose of assisting the *gradual* propulsion of the lens. Of course, the assistant would depress the lower lid, and slightly press the extremity of the index finger on one side, and the middle finger on the opposite side of the eye-ball. I do not know that this mode of operating possesses any advantages not comprehended in that usually adopted, and, inasmuch as the pupil is very apt to follow the course of the incision, it is in one respect inferior to it; for, when this accident occurs after the upper section of the cornea, it has a very mischievous effect on vision, whereas, if it take place after the lower section, it occasions no inconvenience—a pupil drawn towards the lower part of the cornea is much better adapted to the purposes of vision than one at its upper part. When the pupil is drawn upwards so that its superior border is formed by the most elevated point of the incision of the cornea it is frequently covered more or less by the upper lid, which, in its natural state, constitutes the chief part of the palpebral covering of the globe. The chief advantages of the upper section in preference to the lower are deducible from—first, the situation of the opacity which sometimes occurs around the incision and remains after it has healed; if such opacity take place it is quite evident that it will be less likely to interfere with vision if situated at the upper than if placed at the lower part of the cornea; and secondly, when the section is made at the upper part of the cornea it will be more likely to be kept quiet—the severed parts will be more likely to be maintained in apposition—than when the incision is made in the reverse direction; and, besides, the edges of the wound will not be exposed to the risk of irritation from the friction of the tarsal margin upon them —the lower tarsal margin will frequently and injuriously rest upon the divided part of the cornea when its division is made at its lower half, but, when the upper section is made, the tarsal margin covers the eye-ball and hangs below the incision.

*After treatment and subsequent progress of the case.*—The mode of dressing the eyes after an operation for extraction is entitled to great attention. When the surgeon has removed the lens and its capsule as far as he is able, or as far as he deems it advisable, and ascertained the clearness of the pupil, he should carefully adjust the divided edges of the cornea by slightly and carefully rubbing upon its surface the grooved end of the curette, and afterwards moving the upper lid upon the globe, then, having directed the patient to turn the eye upwards, cautiously close the palpebræ after having observed that none of the ciliæ are inverted, and extracting any which have the slightest tendency to turn inwards. It is necessary to raise the upper lid from the globe, draw it downwards, and place its tarsal margin in accurate apposition with that of the inferior palpebra. I am in the habit of placing over them—first, a square piece of linen upon which a little spermaceti ointment has been smeared, and afterwards a thin fold of linen soaked in cold water which is bound upon the eye (not so as to produce firm compression) with a little roller about an inch and a quarter broad, which may be secured to a slightly elastic cap which has been previously placed upon the patient's head. This bandage should be allowed to remain for at least seventy-two hours from the time of its application, when it may be removed, and a similar bandage applied in a similar manner without severing the lids. On the following day, or (if the eyes are perfectly easy and the bandages not at all disturbed) the day but one afterwards, the dressings may be removed, the discharge which had accumulated at and around the tarsal margins cleared away, and the lids carefully separated without disturbing the edges of the wound, in order to ascertain the state of the divided edges of the cornea and of the eye generally. An examination of this kind, if carefully and promptly conducted, (of course, the eye must not be exposed to the prolonged influence of light during this examination) ought at least to furnish us with information—1, respecting the direction of the ciliæ in reference to the globe;—2, the condition of the tarsal margins;—3, the state and characters of the wound of the cornea;—4, the figure and condition of the pupil;—and 5, the state of the eye-ball generally, or of its separate tunics, in relation to inflammation. Presuming that there is very little inflammation of the eye, that the edges of the incised cornea are in perfect apposition, and that the wound is healing or has healed as it should do, and that the cornea is clear, you would replace the bandages and change them daily for a week, when, if the case go on favourably, you need not continue any support to the eye-ball, but simply direct the patient to wear a four-stringed bandage.*

But, things may not go on so favourably, the edges of the wound may not be inclined to unite, or the cornea may bulge, or there may be a great deal of inflammation either of the iris or of the deep-seated textures. The non-union, or the imperfect union, of the corneal flap may take place from a variety of causes. The patient may not possess a degree of constitutional power adequate to accomplish the union of the divided cornea, or, from some defect in the health, the cut edges may be disposed to ulcerate, instead of to unite by the adhesive process, or the matter of adhesion, having been effused and partly organized, may afterwards become absorbed before it has effected a due degree of consolidation, or it may slough, or finally, it may be extended by the spasmodic action of the muscles of the globe, or from other causes, and the cornea may consequently be projected forwards—it may become staphylomatous. When the patient's constitutional powers are too feeble to permit the adhesive process to take place, we must employ various stimulants for the purpose of exciting the energy of the system—such, for instance, as the carbonate of ammonia, and the sulphate of quinine, with an occasional allowance of brandy and water. When, from some defect in the general health, union does not take place, but, in its stead, ulceration of the edges of the wound, we must endeavour to ascertain, and, if possible, to remove or diminish that defect. In the same way the premature absorption or the extension of the organized medium frequently result from improperly adapted medical treatment or some constitutional error which attention and care will be the most likely means of enabling us to detect and obviate.

---

* This consists of a piece of linen sufficiently long and broad to cover both eyes, with a string at each of its corners, which are to be tied at the back of the head.

Inflammation of the iris and of the deep-seated textures is often produced and still more frequently aggravated by the pressure and irritation of tight and badly applied bandages, and when used on the principle of producing pressure, they are very likely indeed to excite much mischief. They are intended to *support* not to *compress* the anterior aspect of the eye-ball, to maintain quietude of the lids, to exclude the light, and to furnish facilities for cooling without injuring the organ. If thick pads of linen are firmly bound upon the eye, the organ will be heated and rendered painful, inflammation will arise, and, if the injudiciously applied bandages are suffered to remain, the *restoration*, not the *loss* of vision, ought to excite surprise. When inflammation of the iris or of some of the posterior tunics takes place, we must be guided in its treatment by the same rules which regulate our practice where a similar stage and degree of inflammation are present, and no such operation had been performed, with, of course, a due regard to the patient's strength. However, it is most necessary to be careful in the administration of mercury, for I have known instances in which mercury has been given under these circumstances and where the union of the corneal flap had apparently taken place, but, from the mercurial action, the recently formed adhesions have been destroyed, and the divided edges of the cornea have never afterwards healed; in old persons also, sloughing of the cornea is very apt to take place after the operation of extraction, if hydrargyrus be freely administered. If, in a tolerably strong person, or at least in persons not absolutely weak and emaciated, there was much pain after the operation, no time must be lost in removing blood by cupping or venesection, and even if there be not much pain afterwards, but, on an examination of the eye, the palpebræ are found to be swollen and vascular, it would be desirable to have recourse to the abstraction of blood without delay, for these occurrences indicate very decidedly the existence of inflammation, which, at this stage, may be subdued with more economy to the powers of the system than if it be allowed to continue and acquire strength by establishment —its full development must be prevented by subduing it at its commencement.

Some medical men have, if I may so term it, a general plan of treatment, which they adopt in all cases after the operation of extraction, for instance, they apply blisters at a certain period after the operation, they give purgative medicine, and they always prescribe a low diet. Many cases will undoubtedly be benefited by the adoption of these measures, and they will generally be useful where there exists a certain degree of irritation insufficient to constitute active inflammation, but they may also not be required at all. If there be little inflammation, if the patient complain of scarcely any uneasiness of the eyes, and if, on examination, the wound of the cornea is looking as it ought to do—being neither ulcerated, the lymphatic deposition constituting the medium of union being neither superabundant nor deficient—I do not see the necessity of teasing the patient with blisters, for the application of which no better reason can be given than that they are *sometimes* useful; and again, if the bowels are regularly open and the eyes are not much inflamed, and the divided cornea is properly uniting, why administer a quantity of drugs? The after-treatment of patients who have undergone the operation of extraction, will, I repeat, be of a varied character—it will be determined by the symptoms of particular cases, and will be conducted, for the most part, on general principles.

The diet of such patient's should be limited to mild, unstimulating, and, if not liquid, at least to soft aliment, for we have to guard against inflammation more than against any thing else, I should rather have said, we have to moderate inflammation, for a certain degree of inflammatory action is the inevitable result of the infliction of so serious an injury to the textures of the eye as, under the most favourable circumstances, the extraction of the lens produces. Hence will be perceived the propriety of confining the patient to an unstimulating diet, and the necessity of proscribing all food requiring much mastication, and of prohibiting every thing which has a tendency to agitate the body, or call the muscles of the face into vigorous action. But, if the patient is old and feeble, if the corneal flap does not heal properly, and if the cornea itself appear hazy and disposed to slough, so far from lowering the diet its quality ought to be improved, and even active stimulation may be requisite. At an early period of my professional life I had frequent occasion to observe the mischievous tendency of lowering the quality of the diet and diminishing the accustomed stimulus of very old and feeble persons. Certainly it would be culpably negligent not to obtain a knowledge of the previous habits of individuals; if they are strong and plethoric and have been accustomed to live very freely, and if particularly we have prepared them, by a thorough depletory system, for the operation, and have enjoined rigid abstinence after it, we must carefully notice the effect of this change in the diet upon the state of the cornea and constitution, and regulate our proceedings accordingly.

In endeavouring to guard against the occurrence of acute inflammation of the eye after the operation of extraction we must not forget the importance—the absolute necessity, of preventing the access of light to the retina; it is indispensably requisite to confine the patient to a dark apartment for at least five or six days after the operation.

Sometimes a small vesicle will arise in the site of the wound of the cornea, and will excite a good deal of uneasiness, and, when this occurs, it would be proper either to open it with a lancet and discharge its contents or snip it away with a pair of scissors. If a portion of the iris or of the hyaloid membrane intervene between a part of the edges of the cornea a few days after the operation it would be correct practice to attempt its reduction by means of the blunt extremity of the curette, but if we cannot return it into the anterior chamber, and if the eye is not in a condition to bear the use of the nitrate of silver drops, and if, at the same time, the prolapsed portion of iris or hyaloid membrane give rise to a good deal of irritation, the projecting part may be snipped away by means of the curved scissors, or it may be punctured with a cataract needle.

Various applications to the eye are much recommended, and I am in the habit of requesting the bandages which are placed upon the eye-lids to be kept wet with cold water applied to them carefully and frequently by means of a sponge, and this is preferable to the use of goulard water, inasmuch as it does not stiffen the bandages and render them so hard and uncomfortable as they generally become when soaked in the *lotio plumbi acetatis.*

When there is a mass or web of languid looking lymph at the edge of the incision, when the wound of the cornea assumes a pale glassy appearance and is disposed to ulcerate independently of inflammation of surrounding parts, you may touch it daily with a camel-hair pencil dipped in a weak solution of the nitrate of silver or the diluted vinum opii, and direct the zinc lotion to be used many times during the day.

When speaking of the application of bandages I forgot to mention that it is desirable to bind up both eyes even when an operation has been merely performed upon one, for in this way only can we effectually control the movements of the eye, and secure it from the influence of light.

*Occasional ill effects consequent on the operation of extraction.*—After the operation of extraction—1, the cornea may slough, or become staphylomatous or opaque;—2, the pupil may be distorted, and drawn towards the incision of the cornea, or become much contracted or quite closed;—3, the iris may be prolapsed, or the pupil may be blocked up with a mass of lymph;—4, the posterior capsule may remain and may afterwards become opaque, and opacity of the hyaloid membrane will also be likely to occur;—5, portions of the cataract, which could not be easily removed at the time of the operation, may subsequently coalesce and constitute, what has been termed, *concrete cataract (cataracta aggregata);*—and 6, ophthalmitis may occur and the eye-ball may suppurate and collapse.

1. The cornea is especially prone to slough after the operation of extraction, if the patient be extremely old and feeble, if his system be injudiciously reduced, if the imperfectly united parts be subjected to irritation and displacement, if great chemosis be present, so that the nutrition of the superficial layers of the cornea is much impaired; and finally, if the section of the cornea be unusually ample. MAUNOIR, of Geneva, has written a very able paper on mortification of the cornea from the latter cause, and appears to have witnessed it more frequently than is consistent with very successful practice. Staphyloma of the cornea, may, in the instance under consideration, result from inflammation, impaired vitality, ulceration and superficial sloughing of the cornea. Opacity of the cornea is likely to take place after an operation for extraction, if the wound heal slowly by ulceration, or if an unusual degree of inflammation occur in the neighbourhood of its edges; so that, as a general rule, opacity of the cornea, occurring under these circumstances, takes place near the borders of the corneal incision.

2. If the pupil be drawn towards the incision it is, for the most part, either because the iris has been wounded, or because some part of its margin has been paralysed by the passage of the lens over it, and this is more likely to happen when the crystalline body is projected from its capsule so forcibly, that, to use Mr. Abernethy's quaint language, "it may be caught in a bottle." Undoubtedly the lens should be removed very carefully and gradually, gently canted, as it were, through the pupil, by being cautiously tilted over the lower loose border of the iris; and, in those instances, where the regularity of the pupil is destroyed by paralysis of any part of the iris, friction of the cornea with the curette, and rubbing the eye-lid upon the globe must be employed for the purpose of restoring its circular appearance, and, in many instances, it is quite desirable to pass the curette beneath the corneal flap, and endeavour to cause the iris by gentle means to resume its proper position. Closure of the pupil generally results from iritis, and in every case where a tendency to this disease exists in connexion with the inflammation excited by the operation of extraction, the local employment of belladonna should invariably be conjoined with the various other curative measures.

3. If the iris become prolapsed immediately after the removal of the lens, this prolapsus must be reduced by means of the curette, friction upon the eye-lid, and so on, before the corneal flap is adjusted. If it take place during the union of the incision it may be desirable to puncture it, and discharge the fluid matters which assist to increase the extent of the protrusion, or to lessen its tendency to retire within the eye spontaneously. The pupil may be filled with a quantity of lymph—a lamina or mass of lymph—and I shall treat of this morbid affection when speaking of lymph cataract.

by RICHTER and WALTHER, and subsequently fully discussed by BUCKHORN, and the operation itself was very successfully practised by SAUNDERS, BUCKHORN, GLEIZE, and LANGENBECK. BEER, JAEGER, and BENEDICT, endeavoured to break up the lens, and to depress it, in some instances, by means of keratonyxis, but the result of many of Professor BENEDICT'S cases does not appear to have been favourable, for DR. SCHINDLER wrote an essay on chronic iritis—*Commentatio ophthalmiatrica de iritide chronica ex keratonyxide suborta*—founded, in a great measure, on the cases of inflammation excited by, and which he observed to occur after, BENEDICT'S operations.

The anterior operation of solution is adapted to the cure of the soft or fluid cataract of infants. It consists in passing a fine needle through the cornea, puncturing the anterior capsule, and admitting the aqueous humor to that portion of the lens which does not escape into the chambers of the eye when its capsule is lacerated.

*Mode of arranging and securing the patient.*—The mode of securing very young patients, best calculated to restrain their struggles and exertions during the performance of this operation, is as follows:—fix their arms closely and firmly to their side, pass a folded sheet round the body, and pin or tie it securely; then place the little patient in a recumbent position upon a table, with the head and shoulders a little raised, and direct an assistant to fix the head by pressing the hands firmly on each side of it.

*Characters of the needle to be employed.*—The needle for this operation should be extremely fine, small and sharp, it should be slightly flattened for a short distance from its point, and should cut on each of its edges to facilitate its passage through the cornea; it should be so made as gradually to increase in size from its point so that its introduction may not cause the escape of the aqueous humor; in fact, the opening in the cornea should be accurately filled by the needle; but it should always be extremely small—that is a *sine qua non* of its fitness for the purpose it is intended to answer—as the object of its introduction is limited to the free laceration of the capsule, which may be done as effectually with a small instrument as with a larger one. If a large coarse needle be used, inflammation and opacity or ulceration of the cornea may be expected to occur, and if the needle be not rounded towards its handle and at a little distance from its point, the cornea may be extensively and very irregularly divided. The globe of the eye should be steadied by means of PELLIER's speculum—young operators at least should have the eye so steadied—which must be held by the operator when the right eye is the one selected for operation, and, on the contrary, by the assistant when the left organ is the subject of operation.*

*Mode of performing the operation.*—The needle should be held pretty much as a person would hold a common writing pen, and it should pierce the cornea very near to its junction with the sclerotica, its point should be directed obliquely backwards towards the centre of the pupil, and with one or two gentle movements the capsule of the lens should be freely scratched and torn.

The pupil should be well dilated prior to the performance of this operation, and I need scarcely remark, that from the nature of the operation and the situation in which the needle enters the eye, this precaution is highly necessary, and that if it be neglected the iris will be very likely to be injured.

---

* I do not use the speculum myself, but I believe it is generally used by others. I am satisfied that it produces much more pain than even the punctuation of the cornea, and that it is a chief cause of the severe inflammation which too frequently succeeds the posterior operation of solution. My objections to the use of the speculum are more fully stated in the third volume of the *Transactions of the Provincial Medical and Surgical Association*, p. 381.

*After-treatment.*—The after-treatment consists in the partial exclusion of light, the occasional administration of laxative medicines, and the strict observance of abstinence as respects the diet; active treatment may be demanded if acute inflammation should supervene, which is by no means likely to happen unless the operation be badly performed, or unless the operator be too anxious to render his first operation decisively effectual.

It may be necessary to repeat this operation two or three times, and this is far preferable to the infliction of any great degree of injury on any one occasion from an absurd and mischievous desire to ensure the entire absorption of the lens by the influence of the first operation. In ordinary cases of congenital cataract I have never had occasion to repeat this operation more than once.

These two methods of operating (the anterior operation of solution and extraction) comprise all the feasible operations performed for the cure of lenticular cataract anterior to the iris, (for I am unwilling to mention reclination and depression among their number, believing, as I do, that they are much more advantageously performed in a manner to be presently explained) and if we just review the number and importance of the textures which have been divided or injured, we find that, with the exception of the parts actually implicated in the disease, the cornea alone is injured; at least, they are the only parts the texture of which is necessarily penetrated; for, although the iris is certainly too often bruised and otherwise injured in the extraction of the lens, it is not necessarily or frequently either penetrated or lacerated in the performance of either of these operations. Now the cornea is not a highly sensitive part, and therefore, these two operations give less pain than those which remain to be explained; it is not a richly organized part, and therefore, it is not very likely to become either acutely or extensively inflamed from an injury which is limited to a small part of its texture; it is not a deep-seated part, and, on account of the facility of removing the defects inflammation of its texture has a tendency to produce, its inflammation is not likely to cause that serious impediment to vision which, inflammation of the deep-seated textures—from the delicacy of their structure, the disposition to extension of inflammatory action when so seated, its tendency to become acute and to lead to products which cannot be removed and changes which cannot be rectified—so generally occasions.

### 3. DEPRESSION AND RECLINATION.*

I have already stated that the cases suited to these operations are those in which the lens is firm and not particularly large, and where, for various reasons, we cannot with propriety perform, or are unwilling to perform, the operation of extraction.

**Scarpa** appears to have entered more fully into the merits of the operation of depression than any other surgeon. In his work *on the principal diseases of the eyes*, he says, "I have for a considerable time laid aside the method of treating the cataract by extraction, and have applied myself entirely to the practice of depression, and I see continually great reason to be satisfied with the choice which I have made;" and in a more recent and most valuable paper addressed to the late Mr. Wishart, and published in the *Edinburgh Medical and Surgical Journal*, he has advocated the advantages of this operation with his usual zeal and ability. However, although Scarpa termed his operation "the cure of cataract by depression," he admits that it consists of depression and reclination conjointly—that, in short, it is a modification of, what may be designated, the pure operation of depression.

---

* Among the particular advocates of the method of curing cataract by depression, I may mention the respected names of **Pott**, **Callisen**, **Hey**, **Dupuytren**, and **Scarpa**.

*Characters of the needle to be employed.*—The needle used in the performance of these operations should be lance-shaped, it should cut on both its edges, it should be thin and slightly curved towards its point, and it should also be round-necked; in order that it may readily enter the eye, be conveniently passed between the lens and the iris, possess a sufficiently broad surface to operate upon the lens in the act of depression or reclination, and, at the same time, move freely and as little injuriously as possible in the aperture of the sclerotica, which acts as a fulcrum in the opposite movements of its point and handle. Such are the characters of the needle I prefer, but there exists a great variety of them.*

*Position of the patient.*—I prefer the recumbent position for the patient during the performance of either of these operations, because the head is more certainly steadied when so arranged, whilst the hand of the operator is much better and more conveniently supported.

*Binding up the opposite eye.*—This precaution is much less necessary, than during the performance of extraction, because the fingers of the operator may be pressed more firmly upon, and will, therefore, exercise a greater control over, the motions of the eye-ball; but it is as well to pass a roller lightly upon the closed lids of the eye upon which the surgeon is *not* about to operate—it renders the movements of the opposite organ less frequent and much less powerful. There is a strong sympathy subsisting between the muscles of the globe of each eye.

---

* I have had an opportunity of seeing the cataract needles formerly employed, and originally recommended, by Hilmer, Scarpa, Long, Hey, Lucas, Saunders, Adams, Cooper, and Bowen.

*Operation may be performed either through the cornea or sclerotica.*—The opaque crystalline may be depressed either by passing the needle through the cornea or the sclerotica, but the latter method is almost invariably preferred in this country, and to the description of it I shall confine my present remarks. If a surgeon attempt to recline or depress the lens by passing the needle through the cornea he will find that he cannot move it with sufficient freedom, he cannot readily command its point with a due degree of facility and precision, and he will often fail in his attempts to depress the lens, and, in some instances, he may dislocate it forwards, and will always incur increased risk of injuring the iris.

*The operation.*—As a preliminary measure the pupil should be amply dilated by the application of belladonna to the eye-brow the evening before, and the morning of, the operation, and it may even be necessary to apply a solution of that narcotic to the surface of the eye. The advantages derived from this free expansion of the pupil have been already explained.

An assistant should raise the upper lid as was directed in the case of extraction, and the operator, presuming the left eye to be the one selected for operation, should draw down the lower lid with the fore and middle fingers, which should project a little beyond the tarsal margin; the former (the index finger) being situated towards the external canthus, and the latter (the middle finger) directed towards the lachrymal caruncle; so that the movements of the eye-ball upwards and inwards will be effectually controlled by the projection of the fingers beyond the edge of the eye-lid, and by the firm pressure of the tip of the middle finger *upon* the globe towards the inner canthus. In this way the eye is prepared for the operation whether it be intended to accomplish the reclination or the depression of the opaque lens. I really think it is better to fix the eye by means of the fingers than by the use of specula whenever the surgeon's object is the depression or reclination of the lens; and, I am persuaded the eye may be as securely fixed without as with a speculum, unless, indeed, this instrument be used in an improperly, and therefore inadmissibly, forcible manner.

Now, the operation itself is divided into three stages:—the first, comprehending the punctuation of the tunics; the second, the guidance of the needle from thence to its arrangement upon the lens; and the third, the displacement of the lens.

The needle should be held between the fingers and thumb pretty much as a person would hold a common writing pen, its convexity should be directed upwards and its point downwards and backwards, and it should be passed through the sclerotica at about a line from the margin of the cornea,* and a little below the transverse diameter of the eye-ball, one of its sharp edges being directed towards the iris, and the other towards the optic nerve, and its point towards the opposite side of the globe in a direction midway between the optic nerve and the margin of the cornea, until it penetrates, for a short distance, the vitreous humor; then raising and bringing forward the point of the needle by depressing its handle, and so changing its position that one of its flat sides is directed towards the operator, it is pushed gradually forward within the posterior chamber until its point appears just within the temporal side of the pupil. This account of the management of the needle is applicable to either reclination or depression, but, from this period the process varies as the one or other of these operations may be selected. If depression be intended, the point of the needle is raised and brought slightly forward, whilst its handle is depressed and carried a little backwards, the flat and concave part of the needle is then placed upon the upper border of the lens, and pushed downwards until the needle and its handle form a perfectly straight and even line—until their direction, which was previously oblique, becomes, from the elevation of the point of the needle and the depression of its handle, perfectly horizontal. SCARPA repeats, (and he has been justly criticised for the remark) the propriety of a suggestion originally made by PARÈ who advises that, " after the depression of the cataract, and before the needle is withdrawn, the patient should be directed to turn the eye-ball upwards," in order that the depressed lens, upon which the needle rests, may, by the elevation of the eye-ball, be securely lodged in the vitreous humor.

---

* Different directions are given upon this point:—HEY states, that the needle should penetrate the sclerotica at the sixteenth of an inch from the margin of the cornea; BEER and ADAMS say, a line; SCARPA, rather more than a line; WENZEL, one or two lines; LAWRENCE, a line and a half or two lines; BOWEN, three lines or three lines and a half.

If it be meant to recline the cataract, the point of the needle should not be raised to the summit of the lens—to the highest point of its margin—but merely a little above a line describing its transverse diameter, its flattened concave side being turned towards the cataract, which should then be pressed downwards and backwards, so as to throw the upper part of the anterior aspect of the lens into the lower part of the vitreous humor. Having accomplished this, the needle should be withdrawn with, at first, its flat side towards the iris, and afterwards, as it entered—with its convexity upwards.

In directing the needle to be introduced at a particular part of the sclerotica, various important reasons have determined my choice. I pass the needle at the distance of a line from the margin of the cornea in order to avoid wounding the ciliary processes, and I do not introduce it at a greater distance from that tunic, lest I should puncture the retina. Again, I introduce it a little below the transverse diameter of the eye to avoid the long ciliary artery which is placed on each side of the globe, in, as nearly as possible, that situation; and we could not conveniently operate upon the lens if we introduced the needle much below the transverse diameter of the globe. In directing its point a little obliquely backwards, we avoid the lens, which may be punctured and prematurely displaced if we neglect to adopt this precaution. In puncturing the sclerotica I also direct the flat sides of the needle upwards and downwards (in relation to the erect position of the body) with a view of avoiding the ciliary artery; and, in moving the needle a little on its axis after having completed the punctuation, so as to place its flattened convex side towards the iris, we are taking the necessary means of insuring the safety of the iris, and enabling the needle to pass between it and the opaque lens without prematurely displacing it, which, from the small size of the posterior chamber, could not be done if its sharp edges were directed towards the iris and the capsule of the lens, nor indeed could it be accomplished when one of its flat sides is directed towards the iris and the other towards the lens, unless it be made very thin, and unless the surface of the lens be somewhat compressed. If all these manœuvres are skilfully executed and the operation be properly performed in every respect, the following parts only will be wounded in the punctuation; namely, the conjunctiva and the sclerotica, and, for the most part, also the choroid; the capsule of the lens will be afterwards lacerated, or it will be pushed with the lens, more or less deeply into the vitreous humor. But if it be unskilfully or carelessly performed, the ciliary artery, or the iris, the ciliary processes and the retina* may be wounded, none of which parts, ought to be punctured; but the parts previously enumerated necessarily sustain a greater or lesser degree of injury. If the ciliary artery be wounded, blood will be effused into the vitreous humor, or, as more generally happens, immediately beneath the conjunctiva, and the patient's vision may be, in the former case, seriously and permanently impaired, for, although the effused blood is generally absorbed, yet it is not necessarily so removed; and its presence in the vitreous humor may create great irritation and give rise to a painful degree of tension of the globe.

***What is the exact position of the lens after the operation of depression and reclination, and what situation does it occupy?***—After the depression of the lens its lower border is turned slightly backwards and is nearly in contact with the retina, its upper margin is just on a level with, or a very little below, the inferior part of the pupillary border of the iris in a slightly dilated state of the pupil. It will be seen from this statement of its position, that it is not surrounded by parts which very certainly and securely fix it in its new situation, so that it may rise on the withdrawal of the needle, and particularly if it be rapidly withdrawn; and, on this account, it is desirable to maintain a slight degree of pressure upon its upper border, and not to withdraw the needle by raising its point upwards until it arrives nearly at the sclerotica, for, by doing so, we shall clear away any portion of the vitreous humor which would otherwise present an obstacle to the subsequent elevation of the lens, if that event should be disposed to occur. However, it is a good and proper rule not to withdraw the needle at once, but to raise it *slightly* above the upper margin of the lens, and ascertain by this means whether or not it is disposed to re-assume the situation from which it has been displaced, before withdrawing it altogether.[*] It will be perceived then, that the lens, when so depressed, is retained in its situation chiefly by its own gravity, by the pressure of the vitreous humor, and by the support of the iris in front.

---

* When the retina is wounded by the needle, it is, unless that instrument be introduced much further behind the corneal margin than it ought to be, always the least important and susceptible portion of that membrane which sustains the injury.

There is a serious objection to the extreme depression of the cataract, namely, the pressure of the prominent part of its lower border upon the retina;[†] and it will be generally known that this has taken place by the patient's uneasiness, the complete loss or very serious impairment of his vision, and sometimes by the occurrence of severe pain and sickness.*

---

[*] Some ancient writers are very particular in specifying the time during which the operator should maintain a due degree of pressure upon the superior border of the lens; thus SAVONAROLA says it should be continued whilst a "Pater-noster" can be said or a "Miserere" repeated:—"Et postquam deposueris cataractam teneas eam depressam cum acu, usque quo diceretur unum Miserere, aut tres Pater-noster." See the work of J. M. SAVONAROLA, published in the year 1560.

[†] SCARPA states that the amaurotic affection sometimes following the operation of depression, and usually considered as an effect of that operation, is dependent on some obscure indefinable sympathy which exists between various parts of the eye and its appendages under the influence of particular injuries. *Edin. Med. and Surg. Journal.* Vol. 15, p. 142. This scarcely appears to be a fair mode of meeting the question the Professor was then discussing with Sir W. ADAMS. There is no doubt but that, both in the cases mentioned

The cases in which it will be most likely to occur are those where the lens is rather larger than usual, and when this is presumed to be the case it would be far better to perform the operation of extraction than that of depression. If the surgeon is unable to discover that he has depressed the lens too much until after the withdrawal of the needle, and if the pressure of the lens upon the retina be evinced by pain in the eye, by sickness, and also by total loss of sight and other unpleasant effects, I should strongly advise its extraction with as little delay as possible, not by an incision through the sclerotica, as suggested by Sir JAMES EARLE, for that would be an exceedingly bad and unsuitable operation, but by a section of the cornea made in the usual way; but it had better be rather larger than common with a view of facilitating the extraction of the cataract. If the lens does not advance on the employment of a moderate degree of pressure, it may be withdrawn by carefully introducing the small hook and firmly fixing it in the substance of the lens, and employing gentle and very gradual traction. It is often advised, under the foregoing circumstances, to re-introduce the needle through

---

by SCARPA, and those referred to in the following terms by MR. HEY, pressure of the lens upon the retina was the actual cause of the dimness of vision. "I have seen a few instances," says MR. HEY, "where the eye, upon being examined some days after the operation (of depression,) has appeared to be affected with an amaurosis. The pupil has been found largely dilated, and the patient has had a weak perception of light." *Practical Observations in Surgery*. London, 1810, p. 73.

* I make this statement with a full knowledge that several anatomists and physiologists, and particularly MAGENDIE, assert that the retina may be touched and even punctured with instruments without exciting any painful sensation.

the sclerotica and slightly elevate the lens, but the operation of extraction appears to me far better, and I cannot help recommending it in preference to a repetition of the needle operation. The lens may be depressed, and its sharp border may be thrust between the retina and the choroid and may separate these tunics from each other pretty extensively, giving rise to very severe symptoms, such as pain, vomiting, acute inflammation, and eventual destruction of vision; this is admitted by Scarpa, the great modern champion of depression.*

After the lens has been depressed it becomes, in a great measure, gradually absorbed, sometimes it is totally removed by absorption, but in other instances its hard nucleus remains, and, on dissecting such an eye many years after the operation, it may be distinguished as a small, hard, yellowish or yellowish-brown body at the bottom of the posterior chamber, or rather just within the vitreous humor immediately behind and partly within the posterior chamber. This small unabsorbed nucleus will not, however, interfere with vision; it is situated below the pupil and does not impede vision at all, but by some spasmodic action of the muscles of the globe, a blow upon the eye, concussion of the body, or, from some similar cause, it may be forced from the situation it has so long occupied, and may be either seen through the pupil or it may be witnessed in the anterior chamber, and if in either of these situations it excites much inflammation or presents any important impediment to vision, it should be extracted through as small an opening in the cornea as is consistent with its facile transit. When, from absorption of the septa of the hyaloid membrane, the opaque lens, instead of being depressed or reclined, floats loosely in the vitreous humor, the only chance of effecting its removal is, by taking advantage of its presence in the anterior chamber to pass the cataract knife *behind* it and extract it by a pretty free incision of the cornea. In this way it is prevented from passing backwards through the pupil. If it be allowed to float about in the vitreous fluid it always causes great confusion of vision and frequently excites serious irritation.

---

* Wenzel and Sir W. Adams have given a very gloomy and overcharged account of the evils resulting from depression, which Scarpa and Samuel Cooper have very keenly ridiculed and ably refuted.

I apprehend that where the lens is depressed or reclined, and is not covered by its capsule, it is soon absorbed; and the same may be said where the capsule is extensively torn, but where the capsule is only slightly lacerated, or where the entire capsule surrounds the lens, then the opaque body undergoes absorption very slowly, and, in some instances, a small hard nucleus remains—this nucleus may never be entirely absorbed. Although BEER did not believe that a depressed hard cataract disappeared—was taken away—by the process of absorption,* there can be no doubt that this occurrence continually takes place in nearly all those instances where the depressed crystalline is uncovered by its capsule. I have ascertained the fact by dissection on several occasions.

The position and situation of the lens after reclination differ much from its position and situation after depression. Its anterior surface is placed obliquely upwards and backwards, its superior margin backwards and downwards, its lower border is placed towards the iris, and its posterior surface is situated in an oblique direction towards the bottom of the eye-ball. It is thus firmly impacted in the vitreous humor (the membrane of which must have suffered extensive laceration in order to admit of its impaction) a quantity of which is sustained by the upper surface of the lens, and it cannot, therefore, very readily resume its former position. It occupies with regard to the eye, if I may be permitted the expression, a space between, or rather corresponding to, the external and the inferior recti muscles, and when properly reclined is entirely out of the sphere of vision. Of course I do not mean to say that the lens is actually situated between these muscles, but that a mid-space between them will indicate the situation of the lens in the vitreous humor.* Like the lens in the former case it also becomes absorbed—not always, but very frequently, totally absorbed—and in those instances where it is not, in the course of time, entirely removed by absorption, it is much diminished and is reduced to a small, hard, yellow or brownish substance. This substance may change its situation from the same causes which produced a similar change in the position of the unabsorbed portion of the lens in the case of mere depression, and will require the same description and modification of treatment. It will not be understood that this unabsorbed nucleus will require removal because it rises into its former position and so interrupts the transmission of light through the pupil, but because its agitation, during the movements of the eye-ball and the head, may have given rise to pain, inflammation, and serious impairment of vision. However, SCARPA says, "I do not recollect that any *solid* cataract depressed by me has reascended; nor does any of the numerous pupils recollect such a thing; although *secondary* capsular cataracts occur."*

---

* WENZEL speaks with equal decision upon this point. He remarks, "in all the opportunities I have had of dissecting and examining the eyes of persons after death, some of whom had, long before, been operated upon according to this method of depression, I have always seen the crystalline entire, and in its natural shape." See the translation of his *Treatise on the cataract*, by JAMES WARE. London, 1812, page 15.

---

* There is a good abstract of DR. W. SÖMMERING's published opinions *on the organic alterations in the interior of the eye after the reclination of the lens* in the *Lancet* for November, 1828. My own opinions respecting the condition of the eye after the reclination of the lens have been derived from comparatively few opportunities of rendering the matter the subject of post-mortem examination, so that I have not been able to explain all the morbid changes with the extreme minuteness and apparent fidelity with which he has described them.

*Occasional morbid effects of the operation.*—We say the consequences or morbid effects of this operation are of two kinds, namely, immediate and remote. Its immediate consequences are, inflammation in its various forms and degrees, and hæmorrhage into the vitreous cells; its ultimate occasionally occurring morbid effects are, displacement of the unabsorbed lens or its nucleus, amaurosis, suppuration of the eye-ball, closure or other alteration of the pupil, and lymph or capsular cataract. The last class of effects rarely take place in a healthy individual, whose eye was, prior to the operation, free from disease, (with the exception of the existence of the cataract) presuming that it has been properly performed, and the after-treatment judiciously conducted.

The preceding consequences—occasional consequences—of this operation, constitute distinct diseases which will be discussed at various parts of this *treatise*, so that I shall only remark, with respect to the occurrence of hæmorrhage into the vitreous cells, that, in all the instances in which it has taken place under my own observation, the blood has been effused immediately after the operation, and has been gradually absorbed, so that at the period just before the process of absorption has been completed, an appearance similar to that of incipient fungus hæmatodes has been produced; but, of course, this will not lead to, or at least ought not to occasion, any apprehension respecting the probable presence of the latter affection.

---

* See his letter to Professor MAUNOIR of Geneva first published in the *Annali Universali* and afterwards in the fifteenth volume of the *Edin. Med. and Surg. Journal.* I am not acquainted with any surgeon of the present time who has operated for depression at all extensively without having witnessed the occasional elevation of the lens afterwards. "Des six cataractes abattues par M. MORAND à la méthode ordinaire, trois ont réussi et les malades voient bien; *trois sont remontées.*" *Mémoires de l'académie royale de chirurgie.* Tom. ii. p. 583. —"Since the first edition of this work was published, a cataract, which had been depressed in the eye of an old man, rose again, and came into the anterior chamber, after he had been dismissed cured from the general Infirmary." *Practical Observations in Surgery*, by WILLIAM HEY, F.R.S. p. 74. He afterwards relates an example (case 7) of "cataract rising again, and spontaneously subsiding." Similar statements may be found in the writings of other experienced surgeons.

*After-treatment.*—After either of these operations the patient should be confined to bed and to a dark apartment, no active motion or great muscular effort should be permitted, the eye should be kept cool with goulard lotion, the bowels freely opened by proper purgative medicine, and the diet should be limited to the mildest and most easily digested articles of food. These measures include the plan of treatment that will be required when there is not much inflammation present, but if the iris and deep-seated textures inflame (and the presence of the foreign substance in the vitreous humor, the injury done to parts by the operation, or a peculiar and active susceptibility, and various kinds of derangement of the system, may provoke the occurrence of acute inflammation) then more active means will be necessary; means, however, of the same nature, and carried to the same extent, as in the subduction of inflammation of the same degree of similar parts arising from any other cause.

I should mention that if the patient be allowed to spring suddenly from the table immediately after the operation, the lens may be forced from its new situation; and that it is most desirable that coughing, sneezing, laughing, and all similar agitations, and all active exertion, of the body should be avoided as much as possible for several days after the operation has been performed.

### 4. POSTERIOR OPERATION OF SOLUTION.

*Cases, and conditions of the eye, to which the operation is adapted.*—This operation, as I have before represented, is adapted to soft and common capsular cataracts. It is not required when the cataract is nearly fluid, unless in infants a few months old, nor will it be judicious to adopt it if the cataract be hard; if also the capsule of the lens be very tough and thick, it will scarcely be adapted to its cure, for we cannot divide a tough and thick capsule into a sufficient number of fragments to insure its absorption and place it out of the sphere of vision without inflicting an unwarrantable degree of injury upon the iris, and incurring the risk of exciting more inflammation than it is either necessary or judicious to provoke. In many cases the adhesion of the tough thick capsule to the iris is so firm that rather than destroy it we may detach the iris from its ciliary connexions; an accident which was wrongly supposed by the late MR. WARE, to occasion, with but few exceptions, the loss of vision.*

Before performing an operation of this description care should be taken that no ophthalmia is present, for we should be operating under great disadvantages if we permitted a state of inflammation to precede and accompany the infliction of a new injury. We should be careful also to remove, as far as it was safe and judicious to do so, any mal-condition of the eye, which, if permitted to continue, might have a tendency to increase and maintain inflammation of that organ when rendered irritable by the performance of an operation for the cure of cataract.

---

* See note to his translation of WENZEL's *Treatise*. London, 1812, page 25.

*Preparatory treatment.*—As this operation is generally performed upon children or young persons, it will not be necessary to do more than prescribe one or two doses of opening medicine previously, unless the tongue be very foul, the abdomen tumid, the breath fetid, or unless other symptoms of great disorder of the alimentary canal be present. The pupil should, of course, be expanded as much as possible by the aid of belladonna, the extract of which should be rubbed upon the skin above the eye-brow, or a solution of which should be dropped upon the surface of the eye.

*Arrangement of the patient.*—The little patient should be placed in the same position and secured in the same way as was mentioned in my preliminary remarks to the operation of keratonyxis, so that he may be neither able to move the head or the body whilst the operator is engaged in puncturing the eye and comminuting the lens. This method of securing the arms, and fixing (by enveloping with a sheet) the trunk of the body, will, of course, not be required when the patient is old enough to exercise the necessary degree of self-control during the operation.

*Mode of performing the operation.*—An assistant should secure the steadiness and due exposure of the globe by means of the index and middle fingers, which should be suffered to project beyond the tarsal margin and pressed upon the eye-ball with sufficient firmness to prevent its movements; and the operator should pretty rapidly puncture the sclerotica with a fine spear-shaped needle, precisely in the same situation as for depression or reclination. In puncturing the sclerotica the point of the needle should be directed obliquely backwards, towards the opposite side of the eye, but when the punctuation of that tunic is completed and the needle is advanced two or three lines within the eye, its point should be raised by depressing its handle, and carried between the iris and the capsule of the lens half way across the pupil, it should then be slightly depressed and moved in various directions, and, if the lens be soft, the fragments should be pushed (if they do not spontaneously flow there) into the anterior chamber, but if it be not very soft it had better be divided *in situ*, as advised long ago by BANISTER, BARBETTE, and POTT, and, more recently, by Sir W. ADAMS. The needle should then be withdrawn from the eye just in the same direction as that in which it entered that organ.

Now, it may be necessary to repeat this operation at proper intervals several times before the cataract is completely and entirely absorbed, and this is far better than to employ much and persevering effort in attempting to break it into many fragments by a first operation. The inflammation consequent on operations of this description, when the surgeon has been very anxious to render his first operation successful and has consequently moved the cataract needle about with less ceremony and caution than he ought to have done, is frequently severe and sometimes even destructive to vision; but when little is done at any one time scarcely any pain is produced by the operation, very little inflammation will succeed it, and, if it be necessary, it may be repeated as many times as the circumstances of the case may require. If the surgeon neglect this caution in his desire to render a first operation decisively effectual, his success will be much less considerable than it ought to be.

*After-management.*—Low diet, the application of leeches, the exclusion of light, the administration of purgatives, and the daily application of the extract of belladonna to the forehead, are the usually employed remedial means after the performance of this operation, and I may remark, that the persevering application of the extract of belladonna is exceedingly necessary in order to check the tendency to contraction of the pupil which is often present and which appears to be produced by an irritability of the iritic substance from the contact of the foreign bodies—the comminuted lens—in those cases where neither severe inflammation of the iris nor of the posterior tunics is present. The expansion of the pupil is also necessary in order that a large surface of the comminuted lens may be exposed to the action of the aqueous humor. If the pupil be small, the iris is very liable to apply itself immediately to the surface of the lenticular fragments, and in this way to exclude them from the benefit of the solvent agency of the aqueous humor; and besides, if iritis occur, lymph is very apt to be deposited, and to be entangled by the broken portions of the lens, and to acquire organization, and to this mass, (which consists of the fragments of the lens and imperfectly vitalized lymph) the iris will be much more likely to adhere than it would be if its extent of surface were diminished and contracted by the agency of belladonna, as manifested by the enlargement of the pupil. Of course, other measures may be required in particular cases, and the additional means it may be advisable to adopt will vary with the severity of the inflammation, the part it may attack, and the other circumstances of individual cases. The absorption of the lens, when broken into fragments and placed in the anterior chamber, proceeds with great rapidity in children, and is sometimes advantageously facilitated by the administration of small doses of hydrargyrus cum creta, or other mild mercurial medicines, but I do not mean to say its use is necessary merely on this account, on the contrary, it is improper to give it if no circumstances of a more urgent nature demand its administration. If the operation has been pretty effectually performed, the capsules freely lacerated, the lens sufficiently comminuted, and a certain part of it placed in front of the iris, it may happen that the first operation may be effectual, but, I repeat, that no endeavour must be made to attain this object which involves any great risk of producing acute inflammation. In order that the cataract may be taken away with due rapidity, it is necessary that the solution and absorption of the comminuted lens should take place, without any interruption produced by acute inflammation, and that a small quantity of mercury be administered to facilitate the absorbent process. The time required for the cure of cataract which has been operated upon according to this method, will be varied and mainly determined by the degree of inflammation the operation may have excited, the natural tone and general condition of the absorbent function in the individual who has been the subject of the operation, and the extent to which the comminuted lens is and has been exposed to the action of the aqueous humor.

*Occasional consequences of the operation.*—After the posterior operation of solution the effects to be chiefly dreaded are, inflammation of the iris and its consequences, and I need not enter upon the treatment of the former affection on the present occasion. If the lens is merely separated into two or three pieces, which, by their pressure, produce considerable irritation, and if, at the same time, absorption does not proceed with a sufficient degree of rapidity, it would be advisable to prescribe a small quantity of calomel and opium, to subdue, first, the inflammatory state of the eye, and secondly, to quicken the absorption of the lens.

If the lens upon which the surgeon is operating be harder than he expected he may perhaps not readily be able to cut it into pieces, and he had better not continue his efforts but withdraw the needle and have recourse to some other operation at a future period, but if he has displaced it and cannot easily either depress or recline it then it would be better to extract it at once by an incision of the cornea, rather than incur the risk of hazarding the occurrence of that severe degree of pain and inflammation which the presence of a large firm lens in the anterior chamber, so often excites. We sometimes find that, although the entire lens or a hard lens divided into two or three fragments will remain in contact with the iris, and will even press that membrane against the neural aspect of the cornea, without exciting much inflammation or any material degree of uneasiness, yet, in other instances, it will give rise to intense suffering and acute inflammation, and I apprehend this circumstance is determined by the state of the eye previous to the operation; the extent of the injury inflicted by the operation; by the local and general susceptibility of the patient, and also by the particular condition of his health.

### SECTION XI.—OPERATION UPON INFANTS.

In the course of my observations on keratonyxis, I stated that that operation was peculiarly well adapted to the cure of the cataract of infants—congenital cataract—unless it were performed at a very early period (three or four months) after birth; first, because fewer and less important parts are injured in that operation, and secondly, because the mere laceration of the capsule is, in such cases, usually adequate to their cure. But the same reasoning will not apply if the child have acquired a greater age. If the operation be deferred until the child is twelve or fourteen years old or more, it will then be inadequate to effect a cure unless repeated many times, because the lens (if, indeed, it be unabsorbed at that period) has acquired a much greater degree of solidity, and its capsule has too often become thick and tough, and, where the lens has been absorbed, its two hemispheres will often be found to have coalesced. It frequently happens that in a child having congenital cataract, (the capsule and lens being equally opaque) the lens will become wholly absorbed and the anterior capsule will sink as the lens is removed, until it comes in contact and eventually coalesces with the posterior capsule, so that the surgeon will experience great difficulty in dividing and cutting into fragments an opaque, tough, and thickened capsule of this description. But this is not the only objection to permitting congenital cataract to remain many years before an operation be undertaken for its cure; for, first, the child is deprived of one important means of acquiring information and of being rendered gradually familiar with the various objects of sight—his knowledge does not duly increase with his increasing age; secondly, the eyes acquire an unsteady rolling or rotary motion, which can never afterwards be entirely removed; thirdly, the sensibility of the retina is either weakened or destroyed by a want of the stimulus of light; fourthly, the eye-ball is oftentimes insufficiently developed; and, lastly, a disposition to an irremediable condition of strabismus is produced.

It will be remarked that the retina of a person so circumstanced is by no means placed in the same condition in reference to light, as that of an individual in whom cataract exists only in one eye, for, in the latter case, the stimulus of light upon the retina of the healthy organ produces a certain degree of sympathetic influence or impression upon its fellow, and thus maintains a sufficient amount of luminous impress to prevent the total loss of its susceptibility—to maintain, if I may so speak, its sensibility in operation. But, in the case of a patient suffering from congenital cataract in each eye, the retina has never been duly and properly stimulated, (although even such patients will be able to distinguish a bright light from total darkness) and it becomes gradually diminished in its susceptibility, and, if the disease remain for a long period, its sensibility is totally destroyed and it will never afterwards be affected by, susceptible of, or indeed at all influenced by, the impression of light. These results of delay are, therefore, weighty reasons for the early performance of an operation, namely, the conversion of an easily into a very difficultly cured, form of cataract; the loss of the means of visual observation; the acquirement of a rolling, unsteady movement of the eye-ball; the diminution or total loss of the sensibility of the retina, and perhaps, imperfection in the development of the globe. There are certainly other evils connected with the continuance of congenital cataracts for many years without any attempt being made to effect their cure, but they are of a minor character compared with those I have just mentioned.

There are objections to the performance of an operation for cataract at an *extremely early* period after birth; such as—1, the softness of the eye-ball in very early life;—2, the thickness of the cornea at that period;—3, the proximity of the iris to the neural surface of the cornea; and—4, the great liability to the occurrence of convulsions on the infliction of slight injury at the earlier stages of infancy. A period between the first and third year appears to me preferable to every other, and, *as a general rule*, I believe the time included between those ages to be the best for this purpose. MR. LAWRENCE recommends the operation to be performed earlier; at a period after birth varying from one to two months. DR. FARRE says that the greatest success attended MR. SAUNDERS's operations when performed on children between eighteen months and four years old. It appears from the writings of CHESELDEN* and WARE† that they were in the habit of operating upon young children when affected with cataract, and MR. HEY successfully operated for congenital cataract upon a child two years old; but the credit of introducing this practice to the notice of the profession generally, and distinctly pointing out its advantages and urgently contending for the propriety of this (at the period at which they wrote) innovation on established practice, is due to SAUNDERS and GIBSON.

It may be remarked, that although an eye in which congenital cataract exists is usually very small, yet, it is for the most part perfect as respects the number of its parts, with the exception of perhaps the lens, and that although its various parts are all of them actually existent and evolved, yet the organ, with respect to its totality, is exceedingly small—the actual size of the eye is, (ad-admitting but few exceptions) in fact, so much less than usual that its diminutiveness is palpable to common observation. Whilst upon this subject, I may mention that I have lately had an opportunity of seeing two young persons who were born with cataract in each eye, and in whom the hands and feet were exceedingly small. This imperfection of development was so obvious that a professional friend who saw these persons with me remarked that they appeared like the hands and feet of an infant attached to the limbs of an adult. I have several times observed various errors in the formation and development of different parts of the system in persons suffering from congenital cataract.*

---

* *The Anatomy of the human body*. London, 1792, page 304.

† "I feel it my duty, therefore, whilst writing expressly on the best mode of cure for the cataract, strongly to recommend this operation (the posterior operation of solution) in the cases of infants and young persons." Page 359.

Congenital cataract is more commonly confined to the lens—that is the part which, in the great majority of instances, is primarily and solely opaque; the lens becomes absorbed by a natural process, the capsule then becomes opaque, its two layers coalesce by the retirement of the anterior upon the posterior (which is fixed and cannot advance) capsule, and this tough membrane, formed as I have stated by the union of the anterior and the posterior hemispheres of the capsule, very often acquires adhesions to the iris which renders it necessary to make a section of the cornea, and to remove it with the forceps or hook, or, where the adhesions are very extensive and firm, to cut it away with the small scissors of MAUNOIR or GIBSON. MR. SAUNDERS was, I fancy, the first to point out correctly and decisively,* this conversion of the lenticular into the capsular form of cataract, and though he never adopted the improved mode of treating it, as suggested by GIBSON, he has traced the progress of the changes which take place, in such instances, in a very clear and perspicuous manner; and possessing, as he did, so perfect an acquaintance with the precise condition of disease, I am surprised to find him declaring at the close of his remarks on congenital cataract, that the surgeon "will in vain endeavour either to extract or depress" this thick tough capsular cataract. It will be at once perceived that this opinion was grounded on a superficial acquaintance with the resources of our art in this particular variety of the disease.†

---

* I operated upon a case of congenital cataract some years ago, and afterwards made it the subject of a clinical lecture (See *Medical and Physical Journal* for 1833) in which the effects of the continuance of the disease on the sensibility of the retina, the muscles of the eye-ball, and the development of the eye, were singularly manifest. The conversion of the lenticular into the capsular form of cataract, the concretion of the two hemispheres of the capsule, and the adhesion of the iris to the dense, tough, opaque membrane so produced, were also very distinctly perceived. The removal of the capsules furnished me with the means of making a very useful and interesting preparation which, I suppose, is in the possession of either MR. NORTH or MR. BURNETT, as I transmitted it to the gentlemen who conducted the *Journal* at the time my lecture was published in it.

As respects the mode of performing the operation for common congenital cataract, I may mention that there is nothing peculiar in it, nothing which has not been already explained; either the anterior or the posterior operation of solution may be performed, the pupil being well dilated previous to its performance, but if the pupil be not well dilated I think the posterior operation of solution preferable because the iris of infants is naturally so much nearer to the cornea than in the adult subject that there is much greater risk of wounding it when the pupil is unexpanded, than in performing the same operation upon older individuals, the pupil being in the same condition of moderate contraction. If operating upon a patient for the cure of congenital cataract at any period before one and between six and about thirty years old, we may, as a general rule, perform the posterior operation of solution, but, if operating before the infant is six years old and after he is a year old, we may select the anterior operation of solution as better adapted to meet all the circumstances of the case. When the disease is allowed to continue and become converted into the mere capsular variety of cataract—the lens being absorbed, the united capsules being tough, and much thickened—and in every case in which a tough portion of capsule alone exists, whether it has acquired adhesions to the iris or otherwise, a different mode of procedure will be required. If we endeavour to divide or separate it from its morbid or natural connexions, we shall fail in our attempts, or otherwise increase the annoyance of the patient by rendering that a floating and irritating, which was previously a fixed and unirritating, substance. To this condition of disease the mode of operating so clearly described by MR. GIBSON,* is peculiarly well adapted. A small section of the cornea should be made with **Beer**'s knife, very nearly at its junction with the sclerotica—a section sufficiently large, however, to permit the pretty easy introduction of the requisite instruments*—a fine hook passed within the opening, and the capsule transfixed and withdrawn through the corneal aperture. Sometimes the capsule we are desirous of removing has acquired such firmly organized adhesions to surrounding parts, that, if we persevere in our attempts to hook and withdraw the thickened capsule, we shall infallibly tear the iris from its ciliary connexion. In such instances I am in the habit of passing a small pair of scissors (the extremity of one blade is sharp that of the other a little rounded) within the opening, and, as soon as they have passed a little beyond the temporal side of the pupillary edge of the iris, I raise the handle and separate the blades slightly, then having urged forward the sharp blade for a short distance, I again close them and completely sever the capsule, and, by repeating this manœuvre once or twice, I am enabled either to leave a good pupil

---

* In the same year in which MR. SAUNDERS's opinions upon this subject were published, MR. GIBSON, in a communication addressed to the editor of the *Edinburgh Medical and Surgical Journal*, alludes to the point in the following manner:—"Within a few weeks I have operated upon three patients, about ten years old, who had simple membraneous cataracts in both eyes; and I am strongly of opinion, that at an earlier period these cataracts had been of the milky kind; and that the fluid having been absorbed, the opaque capsule which originally contained it, now formed the membraneous cataract."

MR. WARE, after having performed the posterior operation of solution without success, attempted to remove the disease by making an incision of the cornea, and, on finding that after having punctured the capsule the liquor Morgagni did not escape, he remarks, "from hence it seems evident, that nothing was contained within the capsules, or, in other words, that the crystalline humors were absorbed." (Page 359.)

† This opinion was probably formed from observing the result of cases in which he had merely practised the useless operation of puncturing the opaque capsule.

---

* *Practical Observations on the extraction of membraneous cataract through a puncture in the cornea, &c.* London, 1811. The opinions of GIBSON appear to have been, in a certain degree, anticipated by WENZEL. Referring to secondary capsular cataract, he remarks, "whether the opacity of the capsule be occasioned by one or the other of these operations, the needle is inadequate to the purpose of removing it, and effecting a cure; because, though it may be sufficient to puncture this membrane, yet, when punctured, the sides of the capsule can in no way be removed by the needle from their first position, and, of course, will still intercept the rays of light. It is not impossible that they may again unite. There remains, therefore, no other

---

remedy but the extraction of the opaque capsule, or of the portions into which it has been divided. For this purpose, an incision must be made through the cornea, and a small forceps introduced, with which the opaque portions may be taken away." See **Ware**'s translation of **Wenzel**'s *Treatise on the cataract.* Third edition, page 24. The same advice was given by **Mr. Ware**. Alluding to a case of mere capsular cataract, he says, "I therefore, determined to extract by an incision of the cornea, the whole or a part of each of the opaque capsules."

* I have generally been obliged to make a much larger section than **Mr. Gibson** recommends. We have to avoid on the one hand, the risk of protracting the operation and bruising the edges of cornea, by making the corneal section too small, and, on the other hand, we have to guard against the hazard of increasing the magnitude of the operation, augmenting the difficulty of securing the union of the divided parts, and favouring the occurrence of extensive opacity or of staphyloma, by making the section too small.

without further trouble or to remove those fragments of the capsule which prevent the formation of a good pupil, by the subsequent introduction of a fine pair of forceps.

The application of belladonna to the eye-brow is, of course, necessary immediately after the operation, and it should be applied daily for at least a week afterwards.* The operation ought, under ordinary circumstances, to be performed upon each eye at the same time.

In those instances of congenital cataract in which a *small* opacity only exists either in the centre of the capsule or (which is the more common of the two) of the lens *(cataracta centralis)*, it is not advisable to have recourse to an operation. When it is large enough to give rise to any material impediment to vision, the question of operation may be entertained.

## SECTION XII.—TRUE SECONDARY CATARACT.†

A secondary cataract may be either capsular or lenticular, or it may be compounded of both. In performing the operation of extraction a portion of the lens or its capsule may be left behind, or the lens may elude the attempts at removal, and in each of these cases the opaque substance may constitute an important impediment to vision and may require removal. The appellation of secondary cataract is only applicable where such disease occurs after an operation has been performed, the lens and capsule partially removed, or removed for a certain period, from the sphere of vision. If, in performing the operation of extraction, the lens should sink behind the pupil into the vitreous humor after the section of the cornea is completed, and should afterwards rise and eventually occupy the anterior chamber or block up or nearly fill the pupil, it ought to be removed by a section of the cornea. If, some months after the reclination or depression of the crystalline, the unabsorbed lens should occupy the pupil or fall into the anterior chamber, a similar operation should be performed and the opaque body should be removed, for it is scarcely reasonable to expect its solution and absorption until it has produced great, and frequently disorganizing, inflammation of the textures of the eye. But the *small portions* of the lens and capsule which may be left after this operation and which, by their coalition, may constitute a serious impediment to vision, are better treated by either the anterior or posterior operation of solution. Portions of capsule, however, may become thickened and densely opaque, and they are generally too tough and firmly adherent to the iris to admit of division or separation with the needle without hazarding the occurrence of severe injury. Such a portion of capsule is most advantageously removed by an incision of the cornea as I have previously explained. These are all the varieties of secondary cataract it is necessary to mention, and it will be remarked that, in opposition to those of the third class, they are all composed of either capsule or lens, or of both, in a state of opacity.

---

* **Himly** and **Wishart** preferred a strong solution of the extract of hyoscyamus.

† M. **Hoin** has given an account of secondary cataract, in a paper, ("Sur une espece de cataracte nouvellement observée,") published in the second volume of the *Mémoires de l'académie royale de chirurgie.* After having related the case of a person who died three weeks after **Hilmer** had performed the operation of depression, (the lens alone being opaque and depressed, and the capsule retaining its situation and transparency) upon one of the eyes, and very minutely described the post-mortem appearances of the eye upon which the operation had been performed, he proceeds to say "cette observation me présente deux cataractes dans le même œil; l'une membraneuse ou capsulaire en place, l'autre crystalline abattue." The occurrence of secondary capsular cataract as a consequence of the injury inflicted in depressing merely the opaque lens is admirably explained by M. **Hoin**.

In performing the operation of extraction the anterior capsule only is necessarily lacerated, and, as soon as it is divided, it retracts and is removed from the sphere of vision; sometimes the same thing occurs with regard to the posterior capsule, and a portion of the vitreous humor is discharged, but it more usually remains entire, and it is rarely known to become opaque, and this is explained by a reference to its source of nutrition, for there is very little connexion or communication between the vessels of the two hemispheres of the capsule.* Again, in the operation of depression and reclination, the capsule is sometimes displaced with the lens, and sometimes it remains *in situ*, and unless it be freely lacerated it may become opaque and give rise to secondary membranous cataract. PETIT advised that the capsule should be allowed to remain, under the impression that it might eventually contain a matter which would assist the refractive and adaptive power of the eye after the removal of the lens, but, of course, his advice is very properly discarded from modern practice. It is evident that the anterior capsule should always be lacerated, and, if possible, removed from the axis of vision whether the lens be reclined or depressed. To this method of operating there is, however, one important objection, but though I admit its great importance, it appears to be less consequential than the risk of opacity which exists if the capsule be permitted to remain. The objection to the removal of both the lens and its capsule in performing the operation of depression or reclination consists in the additional rupture of the septa of the vitreous humor which then takes place, so that the difficulty of fixing the lens is materially increased. If the two hemispheres of the capsules are depressed or reclined with the lens, that cupped portion of the hyaloid membrane which is connected with the posterior capsule is necessarily lacerated, and the septa of the vitreous humor sustain a most extensive disruption, and it is found that the tendency to the elevation and mobility of the displaced lens is increased in proportion as the cellular arrangement of the vitreous humor is destroyed. So that, in performing either of these operations, we have to take our choice of two evils, the one, which it is *most important* to avoid, being, the occurrence of secondary cataract, which is favoured by omitting to displace the capsules with the lens; the other, which it is *less important* to avoid, being, the tendency to the elevation and want of fixity of the lens, which is promoted by displacing the capsules and destroying the capsular surface of the hyaloid membrane.

---

* MR. WARE affirms that the secondary cataract occurring after the operation of either depression or extraction consists of an opacity of the *anterior*, and not as WENZEL represented, of the *posterior* capsule, and, he (MR. WARE) agrees with MR. SAUNDERS in supposing that this condition of disease cannot be relieved "by any operation." "Sensible," says MR. WARE, "that it is very difficult to distinguish between the opacity of the anterior and that of the posterior part of the same capsule, after the crystalline has been removed, I have taken the liberty to translate the French words, *capsule posterieure du crystallin*, solely by the words, *capsule of the crystalline.*" Upon this part of the subject the meagre, confused, and inaccurate statements of the English surgeon appear to great disadvantage when compared with the lucid, perspicuous, and elaborate representations of the French oculist, nearly all of which are specially distinguished by accuracy and precision.

In performing the operation of extraction it is not usual (I speak of the practice of those surgeons whom I have occasionally seen perform this operation) to divide the posterior hemisphere of the capsule, and I believe this to be very correct practice, that is, presuming it is perfectly transparent, that the eye-ball is not tenser than it ought to be, and that no indication of incipient glaucoma is present; but, even under these circumstances, secondary cataract is known to take place occasionally from the occurrence of opacity of the posterior hemisphere of the capsule and of the capsular portion of the hyaloid membrane. When either of the capsules are extensively lacerated, they are almost certain to become opaque, so that, if the anterior capsule could remain *in its expanded state* after it has been lacerated for the purpose of permitting the extraction of the lens, it would be found to be opaque, but, as an effect of its elasticity, it retracts to the point where its circumference retains its natural connexions. But, the posterior capsule is not necessarily or frequently touched, lacerated, or in any way injured, and hence the explanation of the transparency it so generally retains after the operation of extraction. However, the injury its anterior hemisphere may sustain, the pressure upon the eye made for the purpose of promoting the exit of the lens, the inflammation to which the operation may give rise, and other causes, may be sufficient to determine its opacity, and hence the occasional occurrence of secondary cataract—cataract consequent on the operation of extraction. Sometimes the posterior hemisphere of the capsule will become atrophied and absorbed,—many parts of the body are liable to become absorbed after they have sustained injury, or after they have been incised, or after the performance of operations in their immediate neighbourhood; the diminution in the size of an hypertrophied prostate after the operation of lithotomy is an illustration of this fact. It appears to me that if the operation of extraction be properly performed, there is very little risk of the occurrence of opacity of the posterior hemisphere of the capsule, and that the matter it secretes for a certain period afterwards (presuming that it retains its transparency) to supply the place of the absent lens, is dissolved by the aqueous humor and taken away by the absorbent surface of the chambers of the eye. In a healthy state of parts this matter is not, when first secreted, very consistent, nor in any degree turbid, but, if acute inflammation take place, then its secretion may become dense and opaque, and the membrane which secreted it may also become opaque, thus producing in the same eye, a secondary cataract, consisting of the opaque posterior hemisphere of the capsule, and a false cataract, consisting of the lymphatic mass secreted by the inflamed membrane. If it were possible that the anterior capsule could be suffered to remain—if a small wound only were made in it, which wound subsequently united—then the new matter secreted by its concave surface, would be clear, and would gradually acquire consistence until it formed a very useful (not perfect, on account of the absence of the proper lamellar arrangement) supplementary lens, which, it appears to me, would be obnoxious to the same diseases, as the original lens. At one time I imagined that the capsular texture was reproduced, but I am now pretty confident that this never takes place, at least in respect to the re-formation of either of its entire hemispheres. In operating upon very young rabbits, in order to ascertain this fact, I divided the cornea pretty freely, and as freely lacerated the anterior capsule, so that it was pretty extensively divided, and, as I think, completely destroyed, but no approach to a perfect lens was afterwards discovered; but, if in an equally young animal I merely made a small incision of the cornea, and divided the capsule by a short clean incision nearly half way across it, and then pressed out the soft lens, a new lens was generally formed, the rent in the capsule healed, and a certain measure of opacity—an imperfect sort of cicatrix —ever afterwards marked the place where I had divided the capsular texture.*

---

* I shall take an early opportunity of publishing my opinions on the various circumstances which are calculated to favour the occurrence of secondary cataract, with an account of experiments conducted

## SECTION XIII.—FALSE CATARACT.

A false cataract consists of some adventitious substance situated either between the two hemispheres of the capsule or between the anterior capsule and the iris—it is not formed by an ordinary and mere opacity of either the crystalline lens or its capsule. There are only four varieties of false cataract which it is necessary for me to mention separately:—namely, 1, the sanguineous;—2, the pigmentous;—3, the lymphatic;—4, the purulent.

### 1. SANGUINEOUS CATARACT.

A sanguineous cataract arises from the deposition of sanguineous matter upon the anterior capsule; it does not, except in very rare instances, take place after the anterior chamber has been filled with blood, constituting the coagulated part of that fluid; but, it is a distinct secretion of coloured fibrinous matter upon the capsule as a consequence generally, of inflammation. The pupil is usually more or less contracted and irregular, and its edge is adherent to the sanguineous deposition which usually occupies the whole of the pupil, consists of a laminated flake of a greater or lesser degree of thickness, and, consequently, destroys vision altogether. The capsule of the lens may or may not be at the same time opaque.

---

in reference to the elucidation of the following points:—1, Is the lens ever reproduced after it has been removed from the eye, and if so, what are the circumstances calculated to favour, or essential to permit, its reproduction?—2, What are the characters of the reproduced lens?—3, What is the effect of wounds of the capsule, of various dimensions, inflicted by various instruments?—4, Is the anterior hemisphere, or either hemisphere, of the capsule ever reproduced.

If the deposition of coloured fibrine upon the anterior capsule constitute the sole impediment to vision, it may be removed, if capable of being detached, through a small incision of the cornea. It would only be necessary to make an incision of the cornea comprehending about one third of its circumference, and, with a fine forceps or hook, drag the whole of the opaque substance through the corneal section; but, if the lens and capsule be also opaque, then it would be better to complete the section (if having previously made it only in part in the expectation that false cataract merely existed) and extract the lens and its capsule, together with the opaque matter upon its surface, first separating, as far as possible, by the gentle use of a spear-shaped cataract knife or an iris knife, any adhesions which may exist between the iris and the opaque deposition.

The after-treatment of such a case is precisely the same as the after-treatment of an ordinary case of extraction. The injury inflicted will be very likely to bring on severe inflammation, and it will be our object to adopt every measure, immediately after the operation has been performed, which is calculated to avert and diminish that inflammation.

### 2. PIGMENTOUS CATARACT.

This variety of cataract consists in the attachment of a certain portion of the uvea to the anterior capsule. This attachment of the uvea to the anterior capsule may be induced in two modes. In the first place, a mere blow upon the eye or some similar injury may detach a portion of the uvea from the iris and project it upon the anterior capsule, to which it may adhere; or, after inflammation of the iris the pupil may contract, and the iris may become slightly adherent to the capsule of the lens, but, by the employment of belladonna or from other causes, it may afterwards become detached, leaving behind the uvea which still adheres to the anterior capsule—the substance of the iris is withdrawn, its pigment alone remains, and marks the extent of the originally contracted state of the pupil, and demonstrates very clearly the occasional influence of mercury and belladonna in expanding the pupil and in promoting the absorption of the medium of union between recently inflamed structures.

It is obvious that a layer of dark-coloured matter (like the pigment coating the posterior surface of the iris) immediately within the pupil, will greatly obscure vision, and it is equally evident that it may be removed by operation. Before, however, any operation be undertaken, it is desirable to ascertain the condition of the deep-seated textures of the eye, for the injury or disease which produces the pigmentous cataract, sometimes unfits the retina for the purposes of vision, or injures the posterior tunics generally, and if this take place, it will be evident that no advantage will be gained either by the removal of the lens and pigment, or, by the removal of the pigment upon the capsule, merely. If there is reason to believe that the posterior tunics are uninjured, and that the loss or great impairment of vision which is present results solely from the existence of the pigment upon the capsule, it would be proper to perform that operation for the cure of cataract which, the age of the patient and the consistence of the lens, would require to be performed under circumstances totally independent of the existence of the pigment upon the anterior capsule.

## 3. LYMPHATIC CATARACT.

The pupil may be blocked up with a mass or layer of lymph to which the iris may or may not be adherent.* This portion or mass of lymph may consist of a mere layer deposited upon the anterior capsule, or it may constitute a large mass completely filling the pupil. The pupil may or may not be contracted and irregular, and the iris may or may not be adherent to this morbid deposition.

This form of false cataract arises either from inflammation of the iris, of the membrane of the aqueous humor, or of the capsule of the lens, and, of course, the inflammation which produced it may, at the same time, have occasioned certain other changes in the various textures of the eye, which are sufficient to constitute the defect of vision which may be present, quite independently of the existence of the lymphatic deposition.

If the form of the eye ball is unchanged, the retina and the other posterior tunics uninjured, and if the iris be not very firmly and extensively adherent to the lymphatic deposition, it may be considered a fair case for operation, that is to say, a surgeon would be justified in telling his patient that he had a certain chance of the restoration of vision by submitting to an operation; for, of course, this class of cataracts is by no means so favourable as regards the result of operations performed for their removal, as the varieties of primary uncomplicated cataract.

---

* Sometimes the lymph is deposited in sufficient quantity to render the iris convex in front; sometimes the lymph is deposited in bars or cross lines; sometimes it projects through the pupil in a pyramidal figure, or it is so arranged as to form a distinct mesh-work or shreddy layer of opacity; in fact it may, by being deposited in a large or small quantity and by assuming various arrangements, give rise to very varied appearances, to each of which some authors have thought it necessary to apply a distinct term, and to give, under such term, a detailed account of the symptoms of that variety of cataract they have so preferred to consider it. This plan of proceeding appears to me not only useless but worse than useless, by amplifying and confusing, in a great degree, a very large and complicated subject.

In cases such as these various modes of operation have been proposed. The surgeon may lacerate the lymphatic layer and detach it from the iris as well as he is able, and afterwards recline or depress the lens, or he may perform the operation of extraction if the iris can be sufficiently expanded to permit the transit of the lens without lacerating its pupillary border, or he may make an incision of the cornea and iris and extract the lens through the aperture by means of a small hook, if pressure be insufficient for the purpose. Circumstances alone, which it is impossible for me to detail, ought to decide the choice of any one of these methods, or influence the selection of any other mode of operating.

After such an operation it would be advisable to maintain, as far as possible, the dilatation of the pupil by means of the local application of belladonna. The ordinary means of preventing the occurrence of acute inflammation or of moderating its severity if it does take place, should, of course, be adopted.

### 4. PURULENT CATARACT.

During inflammation of the iris, of the anterior capsule, or of the membrane of the aqueous humor, there is sometimes a mass of flocculent lymph deposited, not lymph in masses or layers, but a shreddy or reticulated texture of lymph; into this mesh-work of lymph pus may be deposited and entangled, and, in connexion with the reticulated texture in which it is effused, may constitute a serious impediment to the transmission of light; this deposition and effusion I have termed *purulent cataract*, and I am particularly anxious to point out the precise pathological condition of parts which is necessary to constitute the true characters of the disease. It is stated, and particularly by the older writers, that when the lens is absorbed, the capsule may secrete pus, or that the lens itself is converted into a purulent fluid, but I have rarely witnessed any disease of the former description—and my present remarks are not intended to apply to any such affection.* Now the nature of the case I have been endeavouring to describe, will be rendered evident by its appearance and history, and its treatment will be guided by the same principles and regulated by the same circumstances, as that of the preceding variety. I need not extend my remarks by pointing out those slight deviations from the rules already mentioned which particular circumstances may render necessary; it is impossible to mention every shade of difference in detail, and it is equally impossible to point out, within any reasonable limits, the means of providing against every possible contingency. If the iris be not extensively adherent to the morbid deposition upon the capsule, we may extract the lens and its capsule, and also the lymph and pus upon its surface, but if it be so adherent, it would be advisable, first, to depress or recline the lens, and, at a future period, to remove the purulent cataract, by the introduction of GIBSON'S or MAUNOIR'S scissors, through a small section of the cornea, so as to excise it on a level with the pupillary edge of the iris, pretty much as we should excise a tough portion of capsule which blocked up the pupil, and was at the same time intimately and extensively adherent to the edge of the iris. If the pupil be filled with a mass of lymph or puro-lymphatic matter after the lens and its capsule have been extracted, it would be advantageously removed by a section of the cornea made as I have just pointed out.

---

* I am not intending to deny that purulent matter may be secreted by the lenticular surface of the capsule, on the contrary, I feel confident, and am assured, by the evidence derived from post-mortem examination, that, under a condition of inflammation, the capsule may be distended by serous and other effusions. See my remarks on "inflammation of the crystalline capsule" inserted at an earlier part of the present volume.

CONCLUDING REMARKS ON CATARACT.—DR. BOWEN has proposed an operation for the cure of cataract which he has termed *hyalonyxis*, and which really appears to be nothing more than a modification of reclination. I shall quote two paragraphs from his work, and, as he relates very marvellous accounts of his success, I refer the reader to the work itself for further information. "I have," says DR. B., "within the last three years, in Italy, operated on one hundred and sixty cases, and can declare, never to have seen one single example of secondary membranous cataract after the operation, nor an individual case of amaurosis resulting from it. The sequel will, therefore, prove that the wound of the retina, so much dreaded by operators, is of trivial importance, being rarely attacked with inflammation, at least from puncture; indeed, parts most supplied with nerves are little susceptible of inflammation; thus we find the tongue rarely or never inflamed." And again, at page 118, he says, "in the operation of hyalonyxis, admitting the case of the gentleman, who exposed himself too early after the operation, etc., to have been completely unsuccessful, the loss is only one in twenty-six; or, in other words, in one hundred and sixty cases, one hundred and fifty-four were restored to sight by the operation and ultimately succeeded. Five of the cases were connected with weakness of the nerve or amaurosis; hopeless when they were undertaken; there was only a loss of one case from inflammation: not, however, the consequence of the operation, but the too early exposure of the retina to the rays of light."*

Mr. Gibson has recommended that, when the cataract is very soft or fluid, a small section of the cornea should be made, the anterior capsule lacerated, and as much of the soft lens evacuated through the aperture as possible, which may be accomplished by the aid of the curette and by slight pressure upon the eye-ball.† I have already stated that he has advocated, with very creditable zeal and success, the propriety of removing the tough capsule which sometimes constitutes the remains of congenital cataract, by the introduction of a small hook, forceps, or scissors, (as circumstances may render the one or other of these instruments preferable) through a section of the cornea.

Sir W. Adams has suggested that where the lens is firm, portions of it should be sliced away *in situ* and that if, in the attempts to cut away portions of the lens, that body should become displaced, he then recommended that it should be extracted by an incision of the cornea. There is an excellent critique upon this bad method of curing cataract, from the pen of the learned Scarpa, in the fifteenth volume of the *Edinburgh Medical and Surgical Journal.* That excellent surgeon did not fail to assure Sir William, that the practice of slicing away the lens *in situ* did not originate with him, but had been previously performed and recommended by many operators, and among others by that accomplished surgeon—Percival Pott.

---

* *Practical observations on the removal of every species and variety of cataract, by hyalonyxis, or vitreous operation.* London, 1824.

† *Remarks on the extraction of soft cataracts, and those of the membraneous kind, through a puncture in the cornea.* London, 1811.

Many years ago JANIN proposed to extract the lens by making an incision of the sclerotica. "He made his first incision through the inferior part of the sclerotica, at the distances of a twelfth part of an inch from the cornea, with an instrument resembling the ace of spades. This incision was sufficiently large to allow the admission of a second instrument, in shape like a small hook, fixed in a handle. M. J * * made use of this to search, and, as it were, to fish for the crystalline; but, unfortunately, he, at the same time, fished out a large portion of the vitreous humor. He performed his operation on seven patients, not one of whom was restored to sight."*

MR. MUTER has devoted an entire section of his small work† to the consideration of "a new mode of extracting the cataract through an incision in the sclerotica." He does not appear to entertain any sanguine expectation of its extensive usefulness, and merely remarks "as I have some hopes of its occasional utility, and as the mode of performing it is simple and easy, I shall describe the manner in which it may be done." A few years afterwards DR. LÖBENSTEIN-LÖBEL'S "proposal of a new method of operating for the cataract" was communicated to the editor of the *Edinburgh Medical and Surgical Journal*, by DR. VON EMBDEN.‡ He relates an interesting case in which, the sclerotica being divided by an accidental wound inflicted by a penknife, the lens escaped, and, after a slight measure of inflammation, a certain degree of sight was restored. His "proposal, &c." appears to have been founded on the result of this single case; and he intimates that this operation promises *four* important advantages.

---

* See WARE's translation of WENZEL's *Treatise*, page 43.

† *Practical observations on various novel modes of operating for cataract.* Wisbech, 1811.

‡ Volume 13, page 56.

The perusal of DR. EMBDEN's communication induced MR. CHAPMAN to publish a paper upon the same point of surgical practice,* in which he states that, before he became acquainted with the opinions of LÖBENSTEIN-LÖBEL on the extraction of cataract through an incision of the sclerotica near to its junction with the cornea, "in order to ascertain the practicability of such an operation, and no opportunity immediately occurring to me of making the experiment on the eye of a subject previous to its removal from the orbit, I substituted the eyes of various quadrupeds, and on such made repeated trials, in the presence of several medical friends." He afterwards affirms that the operation is by no means a feasible one, and rather sarcastically remarks that, "the object of his communication is not to despoil or deprive DR. LÖBENSTEIN-LÖBEL of any merit he may himself attach to his discovery." The operation appears to be so manifestly improper that I can hardly persuade myself that any surgeon will again be induced to perform it; but in making this statement I do not mean to imply that the performance of the operation by any means necessarily involves the loss of vision, but I am satisfied that it is by far the worst operation which has hitherto been proposed for the cure of cataract. Even a blow upon the eye, of so severe a nature as to lacerate the sclerotica, and permit the passage of the lens through the rent and immediately beneath the conjunctiva, does not always preclude the possibility of regaining a certain degree of vision; and, of course, if the lens be removed by a cleanly incised opening in the sclerotica rather than through a rough lacerated wound produced by a severe contusion of the globe, the chances of the restoration of sight are much increased. With

* Volume 13, page 300.

regard to those operations for the cure of cataract which are generally practised (solution, depression, reclination, and extraction) we may remark that their success is, to say the least, *very probable*, but, in reference to the operation under discussion, we can only affirm, that success is *just possible*.

## SECTION XIV.—CATARACT GLASSES.*

In explaining the importance of the crystalline lens in connexion with the economy and function of the eye, I mentioned its capacity to transmit and refract the rays of light, and that the adaptive power of the eye, as regards its capability of clearly distinguishing objects at various distances, depended, very probably, in a great measure, on some alteration in the figure and situation of the crystalline lens. Hence it happens that when it is removed from the eye, its loss occasions a certain imperfection of vision. If the vision of the patient in the natural state of the eye and prior to the occurrence of cataract were perfect (by which I mean not merely capable of distinguishing objects at a given distance, but competent to distinguish with the customary degree of accuracy, and at the usual distances at which objects ought, judging from the state of vision of persons generally, to be clearly perceived) he will be able to distinguish distant objects only, he will, in fact, be presbyopic, and will have lost the adaptive power of the organ. It becomes necessary, therefore, to employ some artificial means of increasing the refractive power of the eye; hence the necessity of glasses, double convex glasses, of a strength and focus adapted to the particular case. By their assistance the patient will see tolerably well for ordinary purposes, but if more accurate vision is required, a second pair of glasses possessing a stronger refractive property, is necessary, and these are only to be used occasionally, as when reading or writing, or when requiring for a short period for any particular purpose a better state of vision than usual. It has been pretty generally stated that the eye does not retain its adaptive power after the removal of the lens, and this "false fact" has been used as an argument against the supposition that the alteration of the figure or position of the lens has a chief influence in conferring upon the organ of vision in its natural and healthy state, this adaptive property; but that this is an error, or, to use the language of CULLEN, a "false fact," is now pretty universally admitted. Experiments were made upon a man from whom the lens had been removed from one eye only, the other organ being in a normal condition, with a view to ascertain how far the adaptive power of the eye which had been operated upon, remained, and it is stated by DR. YOUNG, who with Messrs. CAVENDISH, HOME, and BRODIE, were present at the time the investigation occurred, that, "after the most patient investigation, it appeared that the imperfect eye, from which the crystalline had been extracted, possessed no power whatever of altering its focus, while the same tests exhibited a very considerable change in the focal distance of the perfect eye." However, although the true adaptive power of the eye is destroyed by the removal of the lens, and is altogether lost for a certain period after the operation of extraction, the employment of the organ without glasses as much as possible, enables the patient in the course of time to see much better at varying distances than he did at first, and this is in no instance so remarkable as in the congenital cataract of children—I mean, in those cases where congenital cataract is cured by an operation at the age of from four to ten. Some years ago I operated upon a child four years old, (residing at Handsworth) and directed the little patient's friends not to employ glasses to assist his sight without my permission, and they carefully obeyed my directions, and this boy is not, at the present time, much more far sighted than many persons whose lens has not been removed.* In this child's case no undue convexity of the cornea—no indication that he was naturally near-sighted—existed, and therefore, I referred the partial acquisition of the capacity to distinguish objects at different distances to the effect of habit, to the operation of the muscles of the bulb upon the eye ball, and perhaps also to certain undistinguishable or at least undiscovered changes in the anatomical condition of some other part or parts of the organ of vision. When a person has a conical state of the cornea and the opaque lens is removed, of course no glasses will be required to be worn afterwards, for the increased convexity of the cornea supplies the deficient refractive property of the eye occasioned by the loss of the lens, and, indeed, such patients are more likely to require concave than convex glasses.

---

* There is a good deal of interesting information relative to this subject in a paper published by Dr. Young in the *Philosophical Transactions* for 1801; and in very many works to which I might refer, we may discover to how great an extent the eye recovers its adaptive power when the lens is removed, simply from habit—from the manner in which it is afterwards exercised.

---

* A case of a similar nature is mentioned by Sir W. Adams. He operated upon a postilion who had been blind from the presence of cataract in each eye, several years, and though at first he was obliged to wear double convex glasses, he was subsequently enabled to manage his horses very safely without them. *Journal of Science and the Arts*, Vol. 2.—The extent to which the ordinary focal power of the eye is capable of being modified by the manner in which it is generally employed, is best explained by referring to the far-sightedness of sailors and the very frequent near-sightedness of literary persons.

The period at which the patient should commence the use of glasses after an operation, will vary with the state of the eye; if there be only a slight degree of inflammation produced by the operation, which very speedily subsides, they may be worn much sooner than where a more severe degree of inflammation is excited, which inflammation remains for a longer period, but in all cases the following *rule* is *absolute*:—do not let the patient commence the regular use of glasses, so long as any important degree of inflammation remains. The inconvenience occasioned by the delay is not to be compared to the injury a premature indulgence of the function of vision may occasion. Of course, they should be used very little at first—the eye should be accustomed to them by degrees; if too much work be imposed upon the organ of vision at first, the eye will be very likely to inflame, and the patient may suffer from a chronic lingering form of ophthalmia, which there may be great difficulty in removing, and which may give rise to very injurious consequences. Accustom the eye to its work very gradually after so long a period of inaction, and do not suddenly contrast, in reference to the exercise of the function of the eyes, absolute indolence with full employment.

To epitomize my remarks on the use of cataract glasses: —1, do not commence their use too soon;—2, use them very little at first, and allow the eye to become very gradually accustomed to its work;—3, use glasses of great strength only occasionally, as when engaged in reading or writing;—4, if a sense of fatigue or aching of the eye-ball succeed the use of glasses, either the glasses themselves are not properly adapted to the defective state of the eye, or they are employed for too long a period. Such are the outlines of the advice a surgeon would feel it to be his duty to communicate to a patient upon whom he had successfully performed an operation for the cure of cataract, and who required the use of double convex glasses afterwards.

Some patients are very anxious to wear exceedingly convex glasses, their sight is so much improved that they will be constantly desirous of wearing them and of increasing their strength occasionally, unless the surgeon very decidedly states that the loss or serious impairment of vision will be the almost inevitable result of such injudicious conduct.

# CHAPTER XV.

## VARIOUS STATES OF DEFECTIVE VISION.

### SECTION I.—MYOPIA.

Myopia or near-sightedness is generally dependent on a defect in the formation of the eye by which its refractive power is so much increased that the rays of light are brought to a point or focus anterior to the retina. In the natural state of the eye persons are capable of reading ordinary print at a distance from the eye ranging from fourteen to twenty inches, and it is at this distance that adult persons whose eyes are in a perfectly normal state and the refractive property of which is consistent with its estimated average power, place the paper from their eyes during the act of writing. But, when the refractive power of the organ is increased, it will be observed that whether writing or reading they will place the head much nearer to the object of their scrutiny than other individuals do in whom no such defect in the construction of the eye exists. I am now speaking of that myopic state of the eye which exists from birth or has been produced by habit; those cases of near-sightedness produced by disease—such, for instance, as conical cornea—or caused by operation, do not now properly come under our consideration.

Myopia is not usually complained of at a very early period of life, nor indeed, until persons begin to employ their eyes in a decided manner in the close and assiduous scrutiny of objects requiring precise and exact vision.

The defect will be evinced in various ways :—the patient will place objects much nearer to the eyes than usual, if reading he will bring the book very close to his eyes indeed, and, when the defect depends on an increased convexity of the cornea, he will place the head laterally in reference to the object he is viewing, so that the rays of light may impinge upon the least convex portion of that tunic. In examining objects at that distance at which others see them very perfectly, he will draw down the eye-brows, approximate the upper and lower tarsal margins, so as to bring them almost into direct contact with each other, and compress the globe with the eye-lids. We may sometimes distinctly remark that the eyes become myopic in consequence of the habits of individuals; thus, a person who in childhood had no such defect, may, if much employed in the inspection of minute objects or too zealously addicted to literary pursuits, become near-sighted as he advances in life. In this way may be explained the facts, that literary persons, for instance, the Professors at our Universities, are frequently compelled to use concave glasses in consequence of having become myopic, at least, if not absolutely compelled, they are induced to avail themselves of the assistance and accommodation they afford; whilst sailors or those much employed in the inspection of distant objects are often the subjects of an opposite defect *(presbyopia)*. This effect of habit on the refractive power of the eye must be borne in mind as constituting a most important fact in the treatment of myopia and presbyopia, and, when speaking of the mode of remedying these defects, we shall take advantage of that circumstance in deciding upon one part of our treatment.

Myopia is sometimes a congenital defect, the eyes of many members of the same family are often myopic from birth, or otherwise they become near-sighted at a very early period of life. Persons who are myopic can read small print more readily than other individuals whose sight is natural and perfect, and their power of vision is increased by looking through a minute aperture in a card or spectacle frame, and only so because under such circumstances the field of vision is much limited and confused, and on this account—on account of the ease and facility with which they read small print, combined with the fact that their vision is not rendered much more defective by advancing age—it is a popular belief that the eyes of near-sighted persons are actually *stronger* than those of other individuals in whom no such defect exists. This opinion is not, however, strictly correct, the real strength of the eye is neither increased nor diminished by the *mere* circumstance of its being the seat of a myopic defect, but, as the cornea becomes flattened by age, and as the organ is less firm, tense, and plump in very old age than in early life, the increased refraction of light is, to a certain extent, remedied by the supervention of those changes in the eye usually connected with extreme senectitude.

It has been said that as myopia usually appears at or about the period of puberty the defect arises from the undue, the too-rapid development of certain parts of the eye, and, on the supposition that this view of the matter is correct—that this irregularity of development actually occurs, and produces the myopia—MR. GUTHRIE has suggested the application of leeches to the eye-lids at regular and pretty frequent intervals.*

Myopia depends in the general on the following changes in the structure and form of the eye. In the first place, the cornea may be too prominent and convex; secondly, the lens may be more than usually dense convex; thirdly, the eye-ball may be longer from before backwards than it ought to be, virtually causing the surface of the cornea to be too remote from the retina; fourthly, the lens may be situated too near to the cornea; and lastly, the textures and humors through which the light passes in its course to the retina may be too thick, dense and viscid—in short, too refractive. Now, this is a perfectly mechanical view of the subject, and is considered in relation to the eye merely as an optical instrument, for, it is observed, that the visual defect we are now discussing does, in fact, arise from some faultiness in the configuration, the density, or the situation of one or more of the parts to which I have referred. It has been supposed that this affection may depend on some mischief in the head, that the evil may arise from the patient's incapacity to judge of the true distance of objects, but as we judge of the distance and magnitude of objects merely by their relation to the same quality and condition of surrounding objects, this explanation cannot be received as satisfactory, so long as the myopic defect is the same in respect to all objects whatever may be their relative distance and magnitude. I have mentioned that myopia may be caused by habit alone—by the habit of exercising the eye too much in the inspection of proximate objects—and have instanced the well-known fact of many literary persons becoming near-sighted and being compelled in consequence to use concave glasses, in illustration of this circumstance, and it is a matter of some interest to enquire if, in these cases, any change takes place either in the situation, the density, or the figure of those parts upon which the light inpinges, or through which it is transmitted in its passage to the retina; or indeed if any change occurs in the figure of the globe. The only alteration I have observed in such cases, is an increase in the convexity of the cornea, and a peculiarly prominent appearance of that tunic, as though it were more raised than it ought to be upon the sclerotica, pretty much the same as the appearance which exists in inflammation of the membrane of the aqueous humor; and indeed it would require peculiarly favourable opportunities to obtain the examination of eyes in which this myopic change has occurred, as well as the greatest possible care, delicacy, and accuracy, in conducting the examination of them with a view of ascertaining the existence of *slight* changes in the figure, density, and situation of those parts in which the refractive power of the eye consists. Who, for instance, could say with decided confidence in the precise accuracy of his opinion, that the cornea was but *rather* thicker than it ought to be, that the lens was *somewhat* nearer to the cornea than usual, or that the aqueous and vitreous humors were very *slightly* increased in density? We can imagine that very slight deviations in these respects from a perfectly normal state of parts may exist, sufficient to constitute, as regards their totality, a myopic defect, without being discovered even though attention may be particularly directed to their detection. In order to arrive at a correct conclusion, we ought first to ascertain the average density of the aqueous and vitreous humors, the defects necessarily consequent on any slight deviation from their proper density, the fact of their being generally conformable to any given density taken in connexion with the changes in vision, the particular density, or any particular density of these humors, may occasion, with the various other circumstances which determine the refractive power of the eye in its healthy state. And again, in order to render our judgment as accurate as possible, in reference to the occurrence or otherwise of any change in the figure, density, and situation of various parts of the eye, in that form of myopia induced by the frequent and prolonged continuance in the habit of inspecting minute and near objects, the density, the thickness, and the figure of the cornea, the density, precise configuration, and situation of the lens with respect to its distance from the cornea, and also the figure of the eye-ball, should be considered in reference to the various parts of the eye or to that organ as a whole, in a condition of perfect health and absolute integrity. It is difficult to imagine how the mere habit of inspecting near and minute objects can produce myopia independently of the occurrence of one or more of the changes just enumerated, because the refraction of light and the accurate convergence of its rays to points upon the retina, is regulated by that organ merely as a mechanical instrument. The mere refraction of light through the textures and humors of the eye is not in any way modified by its transmission through vital parts on account of their vitality. There are habits of other parts and other organs of the system which become established without leading to any appreciable change in the organization and configuration of those parts, in their relative situation, and their degree of density; but the changes in the eye, in regard to its refractive power, are, in my opinion, only referable to habit, inasmuch as the particular customs or habits of the individual effect some of the previously mentioned changes in the eye, as an optical, a mechanical instrument.

---

* I have tried this plan but it has most unequivocally failed under my own observation. It was the practice recommended and adopted by BANISTER, so long ago as 1622.

It is stated by Percy and Reveillé-Parise, in the *Mémoires de l'Academie Royale des Sciences*, that they could not detect any material change in the convexity of the lens in many persons who, during their life, had been most decidedly myopic. Sauvages, in his *Nosologia Me-*

*thodica*, has referred to various changes in the eye leading to myopia, and he says, "Ideò autem pone crystallinum coeunt antequam ad retinam pervenerint; 1° vel quia vis refractiva aquei et crystallini major est; 2° vel quia cornea et externa facies crystallini nimis convexa est; vel 3° quia retina à crystallino remotior; vel 4° quia objectum est nimis dissitum; vel 5° quia pupilla est nimis patula; et ut rectiùs loquar, myopia est in ratione compositâ ex his conditionibus, scilicet vis refractivæ aquei et crystallini, distantiæ crystallini et corneæ à retinâ, distantiæ objectorum, et demùm aperturæ pupillæ." Dr. Porterfield has mentioned particularly the enlargement of the muscles of the globe and the increase of the orbital adipose substance at the sides of the eye, by which "it is reduced to an oblong figure" among the causes of myopia.*

I may mention that a near-sighted eye possesses the power of adaptation, though not to the same extent as a perfectly healthy and natural eye.

It does not always happen that the two eyes are equally myopic; indeed, one of them may be myopic and the other may not be the seat of any such defect even in its slightest degree. Mr. Wardrop says he has met with myopia more frequently in the left eye than in the right. Mr. Ware, who really gave himself a great deal of trouble to investigate this subject, says that the right eye is more commonly affected with myopia than the left, which accords with my own experience. However, Mr. Wardrop makes the following remark in the second volume of his *Morbid Anatomy of the Human Eye*, and it is of importance to bear in mind the facts his statement imbodies when examining eyes in which only a slight defect of vision is stated to exist in one of them. He says, when referring to the relative quality of those organs of the system which exist in pairs, "the vision of the two eyes will seldom be found equally perfect, and in most people the right is stronger than the left eye." Perhaps the use of a single eye-glass for a slight myopic defect explains the more frequent occurrence of decided near-sightedness in the right than the left eye.

---

* *A Treatise on the eye, the manner and phenomena of vision.* Vol. ii. page 70.

*Treatment.*—There is one very obvious method of relieving this defect which is rather too incautiously and indiscriminately adopted, I allude to the use of concave glasses for the purpose of correcting the error occasioned by the increased refractive power of the eye. But the question naturally arises, does the use of concave glasses increase the tendency to this defect? Does it augment that faulty condition of the eye on which the myopic change depends? Unquestionably, concave glasses should be used with great care—as little as possible—and should be so adapted to each particular case that their power should be merely sufficient to *assist* the patient's vision. If, preferring present accommodation to future and permanent advantage, a person will at once have recourse to the use of glasses which are sufficient to obviate fully and completely the myopic defect, will use them constantly, and will consent to increase their power as the increasing requirements of his vision may *appear* to render necessary, then, indeed, he will become gradually more and more myopic until his sight may become unfitted for the purposes of useful vision whatever may be the strength or nature of the glasses he may employ to assist it. The evils resulting from this injudicious attention to present convenience to the neglect of future advantage have been ably illustrated by Sir C. BLAGDEN and DR. KITCHENER, both of whom were near-sighted, and suffered severely from an overweening anxiety to improve their sight by rapidly increasing the concavity of the glasses they employed to assist it. The following extract from Dr Kitchener's simple narrative of his own case is so very interesting that I am satisfied I shall be excused for quoting it. "Seeing," says the Doctor, "that I could not see what persons with common eyes frequently pointed out to me as well deserving my attention, I paid a visit to an optician, and purchased a concave eye-glass, No. 2. After using this some little time, I accidentally looked through a concave, No. 3, and finding my sight much sharper with this, than with No. 2, had my spectacles glassed with No. 3, which appeared to afford my eye as much assistance as it could receive. After using No. 3, for a few months, I chanced to look through No. 4, and again found the same increase of sharpness, &c., which I perceived before when I had been using No. 2, and first saw through No. 3, therefore, concluded that I had not yet got glasses sufficiently concave, and accordingly procured No. 4:—however, this soon became no more *stimulus to the optic nerve* than its predecessors, No. 2 and 3, had been. I then began to think that the sight was subject to the same laws which govern the other parts of our system, i. e. an increased stimulus by repetition soon loses its power to produce an increased effect. Therefore, I refused my eye any further assistance than it received from spectacles, glassed with No. 2, which I have worn for upwards of thirty-one years, and it is very nearly, if not quite, as sufficient help to me now, as it was when I first employed it."

The judicious rule upon this subject is, to dispense with glasses altogether if possible; secondly, to use them, if absolutely required, only occasionally and as little as possible; and thirdly, to employ those glasses the strength of which is adequate not to magnify or diminish objects, but to assist vision without at the same time giving rise to a sensation of dazzling, or being succeeded by pain and aching—by a sense of weariness and straining—of the eye-ball.

It is advisable that a myopic individual should walk out a good deal and view the country around with its more remote objects, or, at least, exercise his vision upon objects more distant than any he can witness in his apartment or study. It is also advisable that he should read and write as little as possible, and also that he should not exercise his vision upon proximate objects more than is absolutely necessary. Reading, writing, sewing, and similar occupations, have a tendency to increase the defect.

In mentioning that those glasses only should be used which neither enlarge nor diminish the size of objects, and with which the patient can see not exactly in the best possible manner, and which do not occasion, when long worn, an uneasy aching sensation in the eye, I am guided by those principles which also regulate the choice of spectacles for every purpose which the various defective conditions of the eye, and the different errors of vision consequent on these defective conditions of the eye, may require; but in the present case, attention to this very judicious precaution is more than ordinarily necessary, for I am persuaded that the constant or frequent use of glasses of too great a power has not only a mischievous effect upon the retina, but has also more than a slight tendency to increase the myopic defect. In these cases, and in all instances of defective vision requiring the aid of glasses where both eyes are equally defective, spectacles are far better than a single eye-glass, which, when frequently employed, wearies and fatigues the eye upon which the task of vision is wholly imposed much more than in other cases where the labour of vision is equally divided.* I believe the common double-concave glasses are better than either the plano-concave, or concavo-convex (as recommended by Dr. Wollaston)—the two surfaces not being exactly parallel, but the inner one being more concave than the outer one is convex.†

With respect to the use of spectacles let me again remark, that the patient will sustain less injury by using a proper pair of them than by straining the eye in his attempts to dispense with them:—Mr. Lawrence says, "I have used near-sighted spectacles for twenty-five years, but my eyes are not more near-sighted than at first."‡

I have not said any thing respecting constitutional treatment, for really this local disease is one which does not appear to be at all influenced by any description of constitutional treatment.

---

* Dr. Wells states, on the authority of Mr. Adams, a celebrated mathematical instrument maker, "that he does not know a short-sighted person, who has had occasion to increase the depth of his glasses, if he began to use them in the form of spectacles; whereas he can recollect several instances, where those have been obliged to change their concave glasses repeatedly, for others of higher powers, who had been accustomed to apply them to one eye only." *An Essay upon single vision with two eyes, together with experiments and observations on several other subjects in optics.* London, 1792, page 124.

† I have seen several near-sighted persons, whose corneæ are not more convex than they ought to be, and whose vision is improved by the use of double-convex glasses. Mr. Nossiter, of Birmingham, has recently consulted me on account of a defect of this nature. The near-sight from which he is suffering does not appear to depend on any undue convexity of the cornea. He tried at my recommendation a double concave glass but he assured me that his sight was rather impaired by its use, whereas it was slightly amended by wearing a pair of double-convex spectacles of a feeble magnifying power.

‡ Lectures in the *Lancet*, Vol. 10, page 614.

## SECTION II.—PRESBYOPIA.

The opposite defect to that I have just mentioned is termed presbyopia or far-sightedness, and is presumed to arise from a diminution in the refractive power of the eye, in consequence of which the rays of light are not converged to an accurate point upon the retina, but (if I may be allowed the expression) are merely approached, so that if we could observe the focus or point of rays so converged, we should perceive it at a greater or lesser distance *behind* or *beyond* the retina. This defect is most likely to happen, in those in whom it does not take place as a congenital defect, from the frequent habit of looking at remote objects, so that those avocations which have a tendency to estrange the eye from the examination of proximate objects and to fix it upon those at a greater distance, disposes the organ to become presbyopic.

Now, the errors in the configuration of the globe—the defects of the eye—upon which presbyopia immediately depends, are—1, an increased flatness of the cornea;—2, an undue proximity of the crystalline to the retina;—3, diminished convexity of the crystalline lens;—4, as it is presumed, a morbid or unusual tenuity of the cornea and diminished density of the various humors;—and 5, a flattened state of the globe by which the distance of the retina from the cornea is rendered less than it ought to be. This latter cause has been particularly pointed out by PORTERFIELD, who takes occasion from thence to enter into a very learned, minute, and elaborate investigation of the effect of this particular conformation of the eye upon vision.*

---

* See that chapter of his work on vision, which treats of "the motions of the crystalline."

SAUVAGES thus speaks of the principal causes of presbyopia:—"1° corneæ et utriusque crystallini faciei, vel alterutrius minor convexitas, ita ut illarum curvatura sit portio majoris sphæræ;—2° nimia distantia corneæ, vel crystallini, vel utriusque à retinâ;—3° vis refractiva corporum pellucidorum oculi solito minor;—4° objectorum nimia proximitas;—5° pupillæ angustia quam Græci *phthisim* vocant." "La presbyopie," says WENZEL, "dépend donc de l'applatissement de la cornée, et par conséquent du rétrécissement de la chambre antérieure, qui ne contient pas suffisamment d'humeur aqueuse, et dans la proportion nécessaire au volume de cet œil; plus souvent encore ce vice est occasionné par le desséchement de la lentille crystalline, comme cela a lieu dans un âge avancé."

It will be remarked that old persons are generally far-sighted, and this senile presbyopia is considered to depend on a flatness of the cornea induced by the diminished quantity of the aqueous humor, and perhaps also by the shrinking and lessened convexity of the lens; and, when the presbyopia is chiefly caused by a shrivelling and shrinking of the lenticular substance, the adaptive power of the eye, as respects near objects more especially, is either wholly lost or very seriously impaired.

Presbyopia generally commences towards the age of fifty, and increases as age advances,* so that an increased convexity of the glasses employed to relieve the defect it constitutes, is rendered necessary. It is first perceived by the patient's inability to nib a pen correctly, or to read or write with the book or paper at the usual distance from the eyes, or to see small objects distinctly when placed near to the eyes, whilst, at the same time, the capacity to perceive distant or remote objects, such as a sign over a door, or to distinguish the time by a church clock, remains; or, to use the words of Sauvages, "sec mulieres presbytæ ut filum per acum trajiciant, acum et filum ab oculis longè removent; senes etiam libros removent ab oculis ultra octo pollices ut distinctiùs legant."*

---

* "La vue presbyte ne change point en mieux avec le tems, au lieu que la myopie se corrige avec l'âge." *Dictionnaire ophthalmologique*, par M. DE WENZEL. Tome ii. p. 39.

As regards the mode of cure and relief I may mention the use of convex glasses, employed with the same precautions as were stated for the selection and the use of spectacles in my remarks on myopia. The eyes should be a good deal employed in the examination of proximate objects, and as little as may be in the inspection of remote ones; and this caution is more particularly necessary when the presbyopia occurs independently of those changes in the eye which are usually connected with old age. The removal of the lens by operation, or its absorption from accident, and so on, always occasion presbyopia in a degree which almost invariably requires the use of double convex glasses.†

### SECTION III.—MUSCÆ VOLITANTES.‡

The *appearance* of minute bodies floating before the eyes is termed *muscæ volitantes;* and they exist either as a congenital defect, as symptomatic of some disorder of the alimentary canal or disturbance or derangement in the condition of the health, or of a decided amaurotic affection, or of a varicose enlargement of some of the ocular vessels, or as the result of mental emotion or depression. Sometimes there is one black spot only, and then the appearance in question is termed *scotoma*, sometimes there are two or more, or there may be an uncountable number of them, in which case they are termed *muscæ volitantes*. Their situation may appear to be definite or indefinite, fixed or varying; their magnitude, I should say their apparent magnitude, will also vary in different instances; their form, or rather their imaginary form will also be subject to great varieties, and their number will also greatly vary. I have known many persons in whom they have existed from birth in the form of one or more black circular spots, which are generally but not always present, and, in those cases, they have continued for years without increasing in magnitude or number, or in any way varying or leading to an appreciable augmentation of the defect of vision their presence originally constituted. I am well acquainted with many gentlemen who have been plagued for a great number of years with these muscæ volitantes which were not a congenital defect, and among them I may mention the name of my respected friend MR. GRAINGER, of Birmingham; the same thing took place in

---

* *Nosologia Methodica*, Vol. i. p. 740.

† Mr. Mackenzie has compressed a good deal of information relative to the selection and use of spectacles in the following paragraph:—"Similar directions must be followed in choosing convex glasses as in selecting concave ones; viz. that each eye is to be tried separately: that the lowest power, or longest focus, which answers the purpose, is to be chosen; and that as the concave glasses made use of by the near-sighted should not make objects appear smaller, neither should the convex glasses employed by the far sighted make them appear larger than natural." *A Practical Treatise*, page 732.

‡ Sauvages has spoken of seven species of the "suffusio" according to the following definition, which species Mr. Wardrop has, for the

---

most part, considered under the more consistent term "ocular spectra."—*Definition of* SAUVAGES. "Genus est morbi imaginarii, cujus præcipuum symptoma est hallucinatio visûs circa objecta, ita ut suffusi ea videre sibi videantur quæ non sunt, ut *muscas*, colores, *scintillas*, quarum imaginum prototypus extra oculos non existit."

The species, as mentioned by SAUVAGES, are;—"1, suffusio myodes;—2, suffusio reticularis;—3, suffusio scintillans;—4, suffusio colorans;—5, suffusio metamorphosis;—6, suffusio dimidians objecta;—7, suffusio nutans." *Nosologia Methodica*. T. ii. p. 175, et seq.

some of the patients of **Mr. Ware**, as appears from his paper in the fifth volume of the *Medico-Chirurgical Transactions;* and the occasional occurrence of this circumstance has been confirmed by the testimony of **Lawrence**, **Travers**, **Guthrie**, and **Mackenzie**.

I will not enter upon a minute and tiresome detail of the figure these muscæ occasionally assume, the situation they appear to occupy, the contortions and motions they seem to make, the shade of colour they seem to possess, and so on, for these things are of much less consequence than to ascertain the condition of the more important part, the functional or structural defect of which they indicate. If a single spot (scotoma) or a variety of spots (muscæ volitantes) have existed from birth, if the individual in whom they occur has not any great imperfection of vision, and if the malady has not increased, there is no indication and can be no necessity for treatment; but if, having existed from birth in a mild form, their number and magnitude increase with a correspondingly increased defect of vision, then of course it would be advisable to institute a minute examination into the circumstances of the case with a view to the adoption of active treatment.

*When muscæ volitantes exist, what are the circumstances which would lead a surgeon to suspect that their presence was merely a symptom of a temporary disturbance of the function of the brain or of the retina, or an indication of organic and confirmed amaurosis?* —If on examining a patient who has been recently annoyed with muscæ volitantes, you find that they have appeared suddenly and are accompanied with great dimness, that the pupil is enlarged and sluggish and inactive, that there are also vivid scintillations with pain either in the orbit or head, and that these symptoms occurred independently of any obvious derangement in the alimentary canal or uterine system, or any particular emotion or depression of mind, or unusual languor and exhaustion of system, the surgeon would be justified in inferring that the patient was not suffering from a state of vision referable to functional amaurosis merely—he would at all events be justified in acting upon this impression. But, if these muscæ volitantes had appeared soon after great depression of the health and strength, anxiety of mind, grief and other mental emotions of a depressing character, or were accompanied by an unequivocal disturbance of the stomach or alimentary canal, or if they appeared after an unusually protracted application of the organ, or after long continued suckling or derangement of the uterine system, he would properly, and no doubt correctly, attribute their existence to some functional and temporary derangement of the system. There is no doubt that muscæ volitantes are sometimes occasioned by the state of the circulation of the retina, and that they are much increased and often perceived only during the diastole of the branches of the arteria centralis retinæ. A change in the state of the vessels of the retina has been represented by **Mr. Wardrop** as by far the most frequent cause of muscæ volitantes. Again, a turbid state of the aqueous, the crystalline, and the vitreous humors has been considered capable of giving rise to the appearance termed muscæ volitantes, particularly when minute substances are perceived or are presumed to be moving in the latter fluid, and this view of the subject is corroborated in as far as they are certainly only noticed in many cases during the sudden and active movements of the eye-ball. **Mr. Wardrop** has alluded to this circumstance, and he says, "they (muscæ volitantes) arise from different causes, and depend either on a morbid condition of the retina, or an opacity of some of the parts of the eye which are naturally transparent. In the latter case, *the opacity must be in the posterior part of the* *vitreous humor*, because experiments, and the principles of optics, prove that no opacity of the aqueous, crystalline, or anterior part of the vitreous humor, can throw a partial shadow on the retina."*

M. NECHER wrote *an essay on muscæ volitantes*, and it appears that he was himself the subject of the malady, which he attributes to the presence of certain parasitical productions analagous to microscopic algæ, in the two chambers of the aqueous humor. DR. PORTERFIELD has expressed a somewhat similar notion upon the subject; he says, "what, therefore, seems to bid fairest for producing these spots and veins (muscæ volitantes) is, small, dense, diaphanous particles and filaments, that swim in the aqueous humor before the crystalline:" and he afterwards states that from certain optical laws, as first explained by the immortal NEWTON, these particles must be of an "oily sulphureous nature." MORGAGNI supposed they arose in some cases from the lodgment of inspissated secretions upon the surface of the cornea. WILLIS and DARWIN, from an insensibility of some fibre of the optic nerve; LA HIRE and LE ROI thought with PORTERFIELD, that these muscæ volitantes arose from some defect in the aqueous humor; and DEMOURS and GUTHRIE, from an increased density, weight and refrangile power of the small portions of the humor Morgagni. DR. YOUNG, who paid so much attention to every thing relating to the philosophy of vision, says, with respect to the cause of muscæ volitantes, "they are sometimes, if not always, occasioned by an opacity of some of the vessels of the vitreous humor, near the retina." And, MR. WARE remarks, "it seems probable that muscæ volitantes depend on a steady pressure on one or more points of the retina, which are situated near the axis of vision, but not exactly in it."

---

* *Morbid Anatomy of the Human Eye.* Vol. ii. p. 239.

Both PORTERFIELD and SAUVAGES conceived that the myopic and presbyopic were very liable to be annoyed with these muscæ volitantes, and in two of the three cases of "muscæ volitantes" related by MR. WARE in the *Med. Chir. Transactions*, myopia is stated to have been present, but MR. WARDROP says, that "short-sighted people are least liable to this affection." (Page 239.)

Sometimes muscæ volitantes exist in one eye only, sometimes in both of them, and they are most distinctly perceived when the patient suddenly looks upward.

The fixed musca (scotoma) MR. TRAVERS says "is generally an organic affection, probably a deposit or extravasation between the choroid and retina, compressing to a certain space the papillæ of the retina, to which the musca corresponds in figure. In other instances, it is independent of deranged structure, and may be presumed to be only an insensible point on the retina." I am confident that I have been able, in many instances, to refer the existence of scotoma to an insensible point of the retina of a very limited extent.

During the formation of cataract, the patient is often troubled with muscæ volitantes, but then they are associated with a very defective state of vision, and with a degree of cloudiness, as though a few dark-coloured particles were floating in the atmosphere of a smoky apartment. The early stages of many forms of amaurosis are also attended with these muscæ volitantes. If the humors of the eye are perfectly clear, if, on exposure to light, the pupil acts with a proper degree of freedom, and if the outline of small objects is quite distinctly perceived, there is little reason to be apprehensive respecting the ultimate safety of vision, even though muscæ volitantes are present in pretty considerable numbers.

An attempt has been made to refer the various kinds of muscæ volitantes to particular pathological states indicating the slighter, or more severe and incurable, forms of amaurosis (TRAVERS, LAWRENCE, MACKENZIE)—I believe, however, that this distinction—a distinction of the highest practical importance—cannot be made, with invariable certainty and accuracy.

*Treatment.*—The treatment of this affection will be determined by a knowledge of the nature of its cause, and the more important disease (if any such exist) of which the muscæ volitantes are but a symptom. When they constitute a symptom of decided amaurosis, their treatment is but the treatment of the amaurotic affection; when arising from disorder of the alimentary canal, the treatment must have for its object the rectification of such disorder; when, from mere fulness of habit, from over-exertion of the eyes, from depression of health and spirits, from atony of any part of the system or of the system generally, from grief, and various mental emotions, the character of the treatment it may be necessary to employ, and the nature of the advice it may be prudent to give, is sufficiently evident.

When muscæ volitantes supervene upon a state of chronic inflammation of the deep-seated textures of the eye, the case does not admit of relief, for it very generally depends on an atonic and enlarged condition of vessels which have been distended until their tone and elasticity is irretrievably destroyed.*

---

* I have now under my care a great number of persons suffering from muscæ volitantes, (induced, for the most part, by working too closely at their employment) which appear to be owing to the temporary or permanent enlargement of some branch of the central artery of the retina. The defect rarely increases if the patient will consent to impose a less degree of labour upon the eye, and it generally disappears in a greater or lesser degree by the use of simple measures.

I shall have occasion to speak more fully upon this subject when referring to the treatment of amaurosis, when I shall also take occasion to refer to scintillations (the "suffusio scintillans" of SAUVAGES, or, as Sir DAVID BREWSTER has stated, "phosphorescence of the retina.") These scintillations, which are present in certain deranged states of the eye and the health, sometimes depend on the effusion of a minute quantity of blood either upon or near to the retina, and they are very variously described by patients, who pay great attention to them and detail their characters to the medical attendant with the most circumstantial minuteness. Sometimes, as MR. WARDROP has mentioned, they are stated to "resemble flowers with numerous petals, or falling stars."

### SECTION IV.—HEMERALOPIA.*

The affection I am about to describe is not frequently witnessed in this country, but in warm climates where the eyes are exposed to a brighter, a more direct and vivid light, it is by no means uncommon. It consists in the total or almost total loss of vision, which comes on towards evening, and sometimes during the night, and more or less gradually or quite suddenly disappears—entirely disappears—at the approach of morning.

---

* MR. BAMPFIELD has written an able and practical article on hemeralopia in the fifth volume of the *Medico-chirurgical transactions*, and the reader will find a good deal of information upon the same subject in an industriously compiled dissertation from the pen of H. E. C. RICHTER, republished in the third volume of the *Scriptores Ophthalmologici Minores*.

Mr. Bampfield has divided hemeralopia into two species, thus:—

*Species* 1. *Idiopathica.*
Hemeralopia sine causâ manifesta.

*Species* 2. *Symptomatica.*
Hemeralopia scorbutica.

He says "the distinguishing symptoms of hemeralopia are a partial or total deprivation of the sight from the time of the setting of the sun to its rise on the following morning, while the sight is distinctly preserved in the day-time."

Hemeralopia does not appear to depend on any structural change in the retina, for vision is quite perfect during the day and only disappears during the night. There are, in fact, a great many causes of this disease, and a great variety of modes of treatment have been recommended for its cure, but whatever may be the plan of treatment adopted, it will not always be in our power to accomplish a cure so long as the patient remains exposed to the cause which produced it, particularly if that cause consist in the exposure of the eye to an extremely vivid light from a residence in tropical climates. I have stated that vision disappears as the light of day declines, and that it is very apt to disappear and to return so long as the patient is much exposed to the bright light of day which originally produced the malady; and when so protracted it may eventually terminate in (atonic) amaurosis (Bontius, Wardrop, Bampfield, Lawrence, Mackenzie.) Mr. Wardrop says, "those who have had one attack of hemeralopia are very apt to have a relapse every year, and always at the same season. BOYER relates the case of a man, forty-three years of age, who had been attacked with it every spring from the age of twenty-three.

In some countries hemeralopia is endemic, and in others it appears as an epidemic at certain seasons of the year.*

As respects the colour of the eyes in which hemeralopia occurs, I shall quote the statements of MR. FORBES and MR. BAMPFIELD, the latter of whom appears to have had very extensive opportunities of witnessing the disease. MR. FORBES observes "that the four cases he met with agreed in one local peculiarity, viz. in having an iris of a very light colour; either a light grey or a light blue." MR. BAMPFIELD states "that the iris of six of the twelve cases which are hereafter mentioned (in his paper) was neither of a light blue nor of a light grey, but was dark;" and he appends to this statement the authority of HIPPOCRATES.

The disease attacks both eyes simultaneously, and is not indicated by any change in the appearance of the eye—the colour of the iris is unchanged, the form and appearance of the eye-ball is as usual, the mobility of the pupil is unimpaired, but sometimes the pupil is more enlarged than it ought to be during the night.

The disease may be slow or rapid in its progress, and the extent to which vision may be destroyed will vary; in some cases, no vision whatever remains from sun-set to sun-rise, in other instances, a slight degree of vision may remain during this period.

It is stated by BOYER, that individuals affected with this disease see perfectly in a dull day whilst the sun is above the horizon, but that as soon as he sets, they see objects very imperfectly by its reflected light, however bright that light may be.

---

* *Nosologia Methodica.* Auctore F. B. DE SAUVAGES, Tom. i. p. 732.—BAMPFIELD in *Medico-chirurgical transactions*, Vol. v. p. 38.

*Causes.*—The causes of night-blindness are chiefly, long continued application of the eyes on minute polished substances, and exposure to the bright light of day under the circumstances previously mentioned, and particularly when reflected from a snowy surface. In warm climates the reflection of a more or less vertical sun from a sandy soil in a clear atmosphere is very likely to produce a great degree of excitement of the retina, which, of course, if it do not lead to some structural change of that part, will probably terminate at the close of each day in its exhaustion or atony; and in this way only can I account for its comparatively frequent occurrence in warm climates. However, it may continue a very long time, and may not lead to any organic change necessarily connected with the permanent loss of vision, as my own opportunities have enabled me to discover, but the statement of MR. BAMPFIELD, who had such ample means of studying its history and observing its frequent occurrence, of viewing its progress and witnessing its termination, is of much greater value than any testimony of mine, deduced, as that testimony on my part must be, from a very limited means of observing such cases. MR. BAMPFIELD saw nearly three hundred cases of night-blindness in the Indies and other parts in a very short period, and he says that they all recovered, perfectly recovered, so that we have the best of all possible evidence to prove that our prognosis in such cases may be of the most favourable character, that is, presuming we can remove the patient from the situation (as regards vivid or mischievously reflected light) which has chiefly contributed to cause the malady.

In those cases where permanent amaurosis has succeeded repeated attacks of hemeralopia consequent on prolonged excitement of the retina, it is interesting to inquire on what pathological condition that loss or serious impairment of vision depends. We shall, however, suspend this inquiry for the present and just glance at the cause of the periodical or temporary atony of the retina from the prolonged impression of vivid light. Does the dimness or loss of vision at particular periods in these cases arise from diminished excitability of the nervous structure of the retina owing to an enlargement of its vessels by which that structure is compressed? There can be little doubt that the loss of vision, on the declension of the bright light of day, is owing to the serious impairment of the susceptibility of the retina from a long exposure to an unduly great degree of light—a mere diminution of tone from great and continued excitement. If we exercise to an improper extent the function of any organ of the body, does not such organ sustain a temporary or a more permanent loss or impairment of its function? Now, if rejecting this explanation in reference to hemeralopia we seek to explain the periodical loss of vision on the ground of structural change or organic alteration, how are we to account for the perfect state of vision during the day, and the rapid recovery of those who are removed from the influence of the cause (vivid light) which produced it?*

We shall soon have occasion to allude to the effect of undue excitement upon the retina in originating inflammation of that membrane, and we shall also have occasion to refer to another effect of great or protracted excitement, namely, atony, and we shall then discuss more in detail the mode in which these opposite effects (atony and inflammation,) result from the operation of the same cause. Although I do not profess myself competent to explain, in every case, the reason why great and prolonged excitement, causes in one instance inflammation, and, in another, induces atony of the retina, yet, in the case before us, it does appear to me that the excitement of the retina produces atony by the general and continued operation of the injurious agent, and I feel assured that, if the influence of the light proceeding, as it often does when it causes hemeralopia, from a merely vertical sun, were applied for a shorter period, in a more sudden manner, and in a more vivid stream, inflammation and various organic changes and not atony would take place.

---

* I may mention that if a person be suffering from hemeralopia he will generally, but not always, be enabled to see distinctly, if, during the night, his eyes are for a short time exposed to the light of a candle.

I have represented that MR. BAMPFIELD has divided hemeralopia into two species, one of which he has termed idiopathic, and the other symptomatic or scorbutic, and he says, in reference of the treatment of what may be termed the scorbutic hemeralopia, "I have frequently directed cathartics, with a view of exciting the absorbents to convey away, and change the humours of the eye with celerity, that a healthy secretion (of the humours of the eye) *may be re-established.*" SCARPA says that "hemeralopia is most frequently symptomatic of disorder of the stomach." MR. WARDROP states that, "night-blindness seems, in most instances, to be connected with derangement of the primæ viæ;" and M. LASSUS is also inclined to the opinion that the primæ viæ are frequently in fault. SAUVAGES mentions among its reputed causes "*pupillæ angustia, retinæ rigiditas et similia.*" MR. MACKENZIE remarks, "this periodic amaurosis (hemeralopia) probably depends on some peculiar state of the choroid, rendering the eye insensible, except to light of a certain degree of intensity; in some cases there is reason to suspect that the proximate cause does not affect the eye, but the brain."

*Treatment.*—The most important part of the treatment of this disease is to restore the tone of the retina by moderating the excessive stimulus which destroyed it; for this purpose the patient should be directed not to expose his eyes to a vivid light, to wear a shade before the eyes so as to exclude the more direct rays of the sun, to use an invigorating diet, and to take such tonic and other medicines as the particular state of the system may seem to require. Blisters are also recommended, and, judging from my own experience of their efficacy in such cases, and regarding also the strong testimony in their favour from various sources, I should most certainly advise their application, either to the temples or immediately above the eye-brow, for they appear to be very much less serviceable when applied at a greater distance from the eyes. MR. LAWRENCE treated a case of hemeralopia at the Moorfields Eye Infirmary (which occurred in a Swedish sailor) by the application of blisters to the temples alone, and the patient perfectly and quickly recovered. The use of blisters as a remedy of paramount utility in the treatment of this disease was introduced by MR. BAMPFIELD, though SAUVAGES and others had previously employed them as a useful adjunct to other means of cure, and in many instances their repeated application will supersede the necessity of adopting the more elaborate, and in some instances, disgusting and rediculous modes of treatment suggested by AVICENNA, ÆTIUS, CELSUS, BANISTER, BONTIUS, PELLIER, DUPON, LASSUS, FOURNIER, SCARPA and PYE.

Treatment of a more active character than that I have just pointed out is seldom required, but I am not inclined to assert that bleeding and the administration of mercury may never be required; circumstances may exist which may render it necessary to bleed and to induce ptyalism. If assured that the defect depends on an atonic state of the retina, that there is no inflammation going forward, and, if the disease does not yield to the remedies previously mentioned, it would be better to try the effect of strychnia applied in the manner I shall presently explain.

### SECTION V.—NYCTALOPIA.

*Definition.*—Qui de die nihil cernunt, sed vesperi et noctu satis acutè vident, ait HIPPOCRATES, illi *nyctalopes* sunt. SAUVAGES.

Oculi visus nocturnus. LINNÆUS.

Visus noctu saltem contingens. VOGEL.

The state of vision, described under this name, comprehends a variety of symptoms and effects of other diseases, as well as an insensibility of the retina to the impression of light, when, as regards the perfect transparency of the textures and fluids anterior to it, it (light) can be freely transmitted through them. Now, a central opacity of the cornea, or of the lens and its capsule, may produce an imperfection of vision during the day merely in consequence of the contracted state of the pupil at that period, by which the major part of the luminous rays fall upon the opaque spot which is nearly as large as the pupil itself, or at least by which they are, from some cause or other, prevented from impinging upon the retina; in the same way an increased susceptibility of the retina may lead to nyctalopia or day-blindness merely by preventing the patient from opening the lids during the bright light of day. Albino's are generally more or less nyctalopic—

nyctalopic in consequence of the absence of the uvea and pigmentum nigrum. Nyctalopia occurs as a form of intermittent disease, it is, in fact, a variety of periodical amaurosis. [See a curious case of "uncommon periodical blindness" in GOOCH's *Surgery*. Vol. ii. p. 52.]

Now, when this disease arises from a central opacity of the cornea or the lens, it is best remedied by the removal of such opacity if that can with propriety be accomplished, but, if otherwise, then the extract of belladonna or the stramonium should be used to enlarge the pupillary aperture. When it arises from an increased susceptibility of the retina, whether that increased susceptibility depend on gastric, uterine, or strumous irritation, its exciting cause must be sought for, and its removal must constitute the primary object of our treatment; but when it occurs as a form of intermittent disease independently of any ascertainable cause, it should be treated by means of the sulphate of quinine, or the liquor arsenicalis, if no reasons connected with the constitutional condition of the patient, forbid their use.

True nyctalopia is a disease of exceedingly infrequent occurrence, and it is on this account that I have dismissed its consideration so very briefly. I am scarcely acquainted with any modern writer who has entered fully upon the consideration of this affection, it is, however, rather minutely discussed by MR. MACKENZIE in a compiled article contained in his work *on the diseases of the eye*, the materials of which are selected with his usual industry and judgment. He quotes a paragraph from RAMMAZINI *(De morbis artificum)* from which it would appear that the disease is sometimes endemic and epidemic, but I am not aware that RAMMAZINI's remark has been confirmed by the experience of any succeeding writer.

## SECTION VI.—VARIOUS VISUAL DEFECTS IN REFERENCE TO COLOURS.

Syn. *Suffusio colorans.**—*Visus coloratus.*—*Coloured vision.*

The visual defects of which I am about to speak are so different in different individuals, that I can only *mention* the *outline* of the more common of these errors; for, although a vast number of cases have been related in illustration of these defects, I do not apprehend there is any great utility in minutely tracing the singularities of individual cases whilst the defects themselves are ascertained to be dependent on certain original endowments or on particular pathological states, and so long as the treatment is confined to certain principles, and directed to certain parts of the system, or to the state of the system generally.

Individuals may suffer from what is termed *coloured vision*, that is, all white or very light coloured objects appear to possess some deeper shade of colour; secondly, there may be an insensibility of the visual apparatus in reference to particular colours; thirdly, there may be a confounding of colours, for example, a patient labouring under this defect may mistake green for blue, and yellow for red, and so on. Now, the vision of such persons may be very good in other respects, it will, for instance, enable the individual to ascertain the form, the magnitude, and the relative distance of surrounding objects extremely well, perhaps even with more than usual accuracy.

---

* *Suffusio colorans.*—Ea est quæ objecta alienis coloribus infuscat, excluso albo et nigro, quie propriè coloribus non accensentur SAUVAGES.

This visual defect in reference to colours is sometimes temporary, in other instances, permanent; it may exist in certain families as an hereditary disease, or it may be left after a severe attack of fever, and as a consequence of various morbid affections of the head. In many instances this defect will be permanent in spite of any measure that may be employed for its relief, the individual may not only be inadequate to detect the nicer shades of colour, but he may actually confound some particular colours with others with which they have scarcely any similarity in the opinion of ordinary observers, and, in such cases, the true disciples of Messrs. GALL and SPURZHEIM believe it to be a primary defect of the sensorium, and that the individual has not the power of ascertaining with (if I may so speak) "the mind's eye"—does not possess the capacity of judging accurately of the various characters, qualities, and properties of colours. We know very well that individuals possess in very different degrees the capacity of appreciating the harmonies of colours and the effects and changes produced by their union, we know also that various diseases and injuries of the head lead to the defect of which we are now speaking, and so far it appears probable that it may sometimes be a sensorial defect—a defect of the judging and discriminating faculty, as regards colours.

I have never regarded this subject as by any means so replete with interest or utility as some have supposed it to be; and I do not see that much information will be communicated by the elaborate detail of cases which chiefly differ from each other (and many of them merely in this respect) in the solitary fact that whilst one mistakes green for yellow, another confounds red with orange, and so on.

In every case that may fall under our observation, it would be proper to endeavour to ascertain the cause of the disease (if it be not, as it frequently is, congenital) and apply the necessary remedies to it, quite regardless of the nature of the error in detail, that is, as regards the mistaking and confounding of this or that colour with some other colour; the confusion and mistakes depend, in nearly every instance where it does not arise from a congenital or hereditary defect, on some specific pathological condition of the brain or of the retina, and the attempt at discovering that pathological condition whatever may be its nature is the only method of establishing the medical treatment—the treatment of this singular malady—on a correct and scientific basis.

The imperfection of vision I have been describing has led to many curious errors, for example, a well known scientific gentleman was angry, on the occasion of his daughter's marriage, because the bridegroom was dressed as he thought in black, whereas he was clad in very suitable garments, as I think, for so gay an occasion, namely, a fine rich claret coloured dress, and in this case the defect would appear to be hereditary.* DR. NICHOLL has related a case where a naval officer purchased a *blue* uniform coat and waistcoat with *red* breeches to match the blue; and MR. HARVEY describes the case of a tailor at Plymouth, who on one occasion repaired an article of dress with crimson instead of black silk, and on another patched the elbow of a *blue* coat with a piece of *crimson* cloth. SAUVAGES relates the case of a delicate woman to whom there seemed to exist "atmospheram cœruleo-viridem circa omnia objecta," and when her health was relieved by the use of musk all objects seemed of a greenish colour. It is stated by DR. PATOUILLET, that several persons who were driven mad by eating the root of the hyoscyamus niger, saw, on the third day afterwards, every object as red as scarlet, and upon this statement Sir D. BREWSTER remarks that "the red light was probably nothing more than the red phosphorescence produced by the pressure of the blood-vessels on the retina." I have lately seen a woman who, after a violent affliction that rendered her very wretched for many months, had experienced a change in the colour of the cornea, the conjunctiva and the sclerotica, these membranes had become of a pale yellow colour, and every object she inspected appeared to possess a tint of the same character. However, the disease I am now engaged in considering is presumed to exist quite independently of any visible change in the colour of the humours or the textures of the eye.*

---

* See *Philosophical Transactions* for 1778.—DR. PRIESTLEY has related a somewhat similar case in the *Phil. Trans.* for 1777.

I am conscious that in the preceding remarks, I have done little more than make a cursory and passing allusion to the subjects which may be correctly comprised within the present *section*, but I am satisfied my readers will agree with me, that in a work of this nature it would be improper to enter at all fully upon a subject which is rarely the object of medical attention, which is very generally a congenital defect—an hereditary disease, and is then perfectly irremediable—a subject upon which I have nothing new to offer, a subject which has been scarcely at all elucidated by the inquiries of the curious, the speculations of the theorist, and the investigations of the learned and philosophical.

---

* There is a good abstract of all the useful information we possess respecting the incapacity to distinguish particular colours and to confound certain colours with others to which they have little resemblance to a correctly discerning eye and a soundly judging head, in the works of WARDROP, (*Morbid Anatomy of the human eye.* Vol. ii. page 210.) MACKENZIE, (*A Practical Treatise on the diseases of the eye,* page 734.) and LAWRENCE, (*A Treatise on the diseases of the eye,* page 571.)

## SECTION VII.—SPECTRAL ILLUSIONS.*

In certain states of the health and particular conditions of the eye, objects of various descriptions, and figures of every diversity, of every kind, colour, attitude, and magnitude, appear to be represented, and are so accurately depicted in the "mirror of the imagination," so clearly represented to "the mind's eye" that the subject of the error though oftentimes perfectly conscious of the illusion obtains and retains a perception of these unreal existences—these imaginary and oftentimes amusingly fantastic objects—sufficiently vivid and accurate to enable him to detail their characters and varieties with very circumstantial minuteness. We are not so much interested in attending to the vagaries and the infinite varieties of these ideal figures as in discovering, as correctly as possible, that state of the retina or of the system which appears to give rise to them. And, as regards the various conditions of the eye, in connexion with the causes of *spectral illusions*, I may mention, great application of that organ, prolonged exposure to a brilliant light, and increased fulness of the vessels of the retina or choroid; and, as regards the various states of the system favourable to the occurrence of spectral illusions, I may enumerate, an extremely nervous agitated and wrecked state of the body generally, sudden exposure to some alarming sight, the reception of some untoward intelligence, any thing greatly depressing the powers of the system, general plethora, derangement of the alimentary canal, various morbid states of the sensorium, and particularly phrenitis, and that condition of the brain which succeeds the sudden loss of a large quantity of blood. Such are the various local and general circumstances, originating or favouring the occurrence of these spectral illusions, whatever may be their size, their shape or figure, their colour, their situation, or their movements. To these states of the retina or of the eye generally, or of the whole system, or of some particular part or organ of it, the surgeon's attention should be mainly directed, and his treatment would, of course, vary in accordance with the particular nature of the cause; and, it is not necessary for me to *detail* the remedial measures it may be necessary to employ, since they are such as the same pathological states would demand whether they led to spectral illusions, or failed to excite such fanciful representations.

---

* The reader may advantageously consult the following works on the subject of this *section* :—SAUVAGES, *Nosologia Methodica*. Tom. i. —DARWIN, *Philosophical Transactions* for 1786.—FERRIER'S *Theory of Apparitions*.—DR. HIBBERT'S *Sketches of the Philosophy of Apparitions*.—NICOLAI'S "Memoir" in NICHOLSON'S *Journal*. Vol. vi. London, 1803. —DR. ALDERSON in the 6th and DR. ARMSTRONG in the 9th vol. of the *Edin. Med. and Surg. Journal*.—*Inquiries concerning the Intellectual Powers, and the Investigation of Truth*; by DR. ABERCROMBIE. Edinburgh, 1830.—DR. BREWSTER'S "Letters on Natural Magic" in the *Family Library*.

Sauvages has the following remark in his observations on *suffusio colorans*, where, however, it appears to be rather misplaced. "Observavit Valsalva hominem qui continuò præ oculis palatia pulcrè decorata et colorata sibi observari videbat." Perhaps, however, the following are among the most remarkable instances of spectral illusions hitherto recorded:—namely, 1, the case of Nicolai, the bookseller, related by himself in Nicholson's *Journal;* —2, the case of a gentleman, related by Dr. Abercrombie, in his *Inquiries concerning the Intellectual Powers;*— and 3, the case of Mrs. A——, as detailed by Sir D. Brewster, in the *Family Library.*

### SECTION VIII.—PHOTOPHOBIA.

In this form of disease there is present an extreme intolerance of light, so that on the exposure of the eye to its influence it excites the most painful effect. It is not, properly and strictly speaking, a disease, but a symptom of a disordered state of the retina or of some other part of the eye or of the system. This painfully increased sensibility of the retina is often present in scrofulous children, and is then termed *strumous photophobia*; it is associated with various abnormal conditions of the uterine system, such as chlorosis, deficiency in the quantity of the menstrual secretion, painful menstruation, and so on, and when so produced, it is termed *uterine photophobia*; it is an attendant on phrenitis *(phrenitic photophobia)* and on various excited states of the sensorium; and it is always present in inflammation of the retina *(inflammatory or organic photophobia)*. Now, in each of these cases, the plan of treatment is sufficiently evident; but there is one remark it may be necessary to make—it is, that, in addition to the ordinary means of treating the disease of which the intolerance of light is merely a symptom, you should always employ blisters or institute some active form of counter-irritation either to the temples or at the back of the neck, and, whilst the photophobia lasts, do not expose the retina to the influence of light more than can be avoided. If no satisfactory cause of the photophobia can be discovered, and if the individual be apparently in good health, counter-irritation is equally necessary, and is often sufficient of itself to remove this increased sensibility of the retina.

It will be remembered that on a former occasion I pointed out the impropriety of attempting to relieve this increased sensibility of the retina, by the local application of narcotics, such, for instance, as the extract of belladonna spread upon the eye-lids, which, by enlarging the pupil, will have a tendency to increase rather than diminish the excited state of the retina. Photophobia is but a symptom of various diseases of the eye or of an affection of some other part of the system, and can only be properly or successfully treated in connexion with a due regard to its cause and particular combination.

## CHAPTER XVI.

### AMAUROSIS.*

By the term *amaurosis* is meant any great imperfection or loss of vision existing independently of any change in the natural transparency of the parts anterior to the retina, or of any manifest varicose enlargement of the vessels of the choroid, or of any material alteration in the configuration of the eye-ball.

The following definitions of *amaurosis* by the indefatigable SAUVAGES are by far the best to be met with in works of the preceding century:—"Visus debilitas absoluta sine ulla organorum opacitate in assueta." And again, "amaurosis est morbus cujus præcipuum symptoma est visûs suppressio, et pupillæ immobilitas sine sensibili oculorum opacitate." However, a slight weakness or dimness of sight may exist in connexion with a trivial diminution in the natural transparency of various parts anterior to the retina, and in such case the term amaurosis is not strictly applicable if no greater imperfection of vision exist than such as may be fairly accounted for by such loss of transparency merely. It will be seen that the term amaurosis taken in this extended sense comprehends a vast field of inquiry, and includes a great variety of pathological conditions of many parts, which it is quite necessary to understand before we can be qualified to determine upon any rational method of treatment.

---

* Gutta serena.—Suffusio nigra.—Cataracta nigra.—Obscuritas.—Hebetudo.—Paropsis amaurosis.—Obfuscatio.—Cæcitas.—L'Amaurose.—Suffusion.—Drop serene.

In many cases of amaurosis we can only discover the precise nature of the pathological condition on which it depends by a most patient, protracted, and careful investigation:—this, at least, will be the opinion of every surgeon who has made this class of diseases an object of attentive study, and if any thing were wanting to render the necessity of such examination evident, the conviction that the restoration of the patient's vision will often depend on the medical attendant's early appreciation of the cause of its absence or impairment will surely be sufficient for that purpose; I have, however, known some medical men who have not appeared to take this view of the subject, they have been content to make a hasty and superficial examination of those who, on account of an amaurotic affection, had sought their advice, and, in the plenitude of their diagnostic knowledge, have at once pronounced the case to be one of amaurosis—simply a case of amaurosis—for which they have prescribed their "one favourite remedy," which the narrowest notions of disease have exalted into the practical importance of a specific.

Preliminary Remarks.—I will not enter fully upon the various divisions, arrangements, and subdivisions of amaurotic affections, some of which are useful and judicious, but many of which are fanciful and ridiculous, serving only to confuse a subject in its nature very complicated and to divert attention from the more important features of this highly interesting class of diseases, but it is necessary that I should explain some of the terms which have been used and some of which are still used, in classifying and arranging these maladies, particularly those of them which will be employed in the course of the following remarks. Amaurosis has been termed *functional*, when it has been caused by some temporary derangement in the action of the brain or the retina, and *sympathetic*, when occasioned by some irritation in a distant part of the system, as worms in the alimentary canal, &c.;—and secondly, *organic* or *structural*, when it has arisen from some positive change either in the organic matter of the retina, or of the optic nerve, or both;—thirdly, *uncomplicated*, when unassociated with any evident defect of, or any discoverable change in, the organic matter of any other part of the eye—when, in short, it exists as the only detectable morbid affection of the eye; fourthly, *perfect* or *complete*, when vision is totally destroyed, to which the term *inveterate* is added if the case has been of long standing and particularly if it has altogether resisted the influence of remedies;—fifthly, *periodical*, when it appears and disappears at certain periods, as happens in nyctalopia, &c.—Such, then, are a few of the terms employed in describing some of the characters of amaurosis, and I might easily add to them many other appellations expressive of some one or more of the conspicuous characters of the affection.

In our attempts to ascertain the actual pathological conditions upon which amaurosis depends, we labour under the great disadvantage of being unable to witness the precise state of the retina under the influence of various morbid operations or conditions; we cannot, for instance, notice the progress of diseased action and the effect of injurious agency upon its structure in the same way as we can observe these occurrences in the more superficial textures of the eye, and we are consequently too often unable to detect them at a sufficiently early period to counteract their baneful effects; but we have still an opportunity of acquiring much information by an inspection of the diseased organ, and by an attentive scrutiny of many sources of collateral intelligence. We have good reason to believe that the existence of irritation in some parts of the intestinal tube produces some change in the vascular department of the apparatus immediately subservient to vision, and that it does not excite an imperfection of vision by means of some undefined and indefinable irritation of a more or less protracted duration which leaves the various organic conditions of the separate parts of that apparatus unaltered and unaffected; still we cannot tell in what the change consists, for it is not in a situation to become the subject of visual scrutiny, nor does it, in many instances, leave behind any trace of its former existence to elucidate the nature of the morbid process of which it consisted; but that it is not of a nature to induce any permanent change in the organic matter of parts is proved by the perfect degree in which vision returns in many cases immediately after the temporary amaurotic attack. So far, then, there appears to be a certain similarity between functional or sympathetic amaurosis, and organic or structural; but it must not be forgotten that the former may, by continuance and establishment, merge into the latter, and that the latter may be entirely removed. To illustrate this statement:—suppose a patient to be suffering from gastric, intestinal or uterine irritation inducing an attack of amaurosis, not by means of any undefined sympathy, but by exciting the vascular action of that part of the eye upon which the luminous impression is first made—by inducing, in fact, vascular turgescence of the retina; now, if this state of things continue, it is evident that organic changes may be wrought capable of inducing an attack of perfect, complete, and even incurable amaurosis. On the other hand, if a person be suffering from an attack of organic or structural amaurosis which consists in the deposition of lymph within, and its admixture among, the texture of the retina from chronic retinitis, surely the state of vision so produced, the disease so consisting, will be termed organic amaurosis, but, if mercury be freely administered, its sorbefacient property may cause the absorption of the recently deposited lymph, the retina may return to its natural state, and vision may be restored. Surely, it cannot be matter of doubt, that the absorbents, when excited by the agency of mercury, will select, will pick out as it were, the inflammatory deposition from the natural texture of the retina, and leave that membrane unabsorbed.

PATHOLOGICAL CONDITIONS CAUSING AMAUROSIS.—Before I speak of the particular symptoms of amaurosis I shall endeavour to direct attention to the various pathological conditions upon which it depends. Unless I first point out the various parts of the eye, of the nervous apparatus connected with vision, or the different parts of the system the diseases or derangements of which are adequate to excite that defective state of vision termed *amaurosis*, it will be impossible for me to give any approach to an accurate and consistent description of this distressing malady, or to point out any plan of treatment which, by modification and adaptation, will be suited to the different and sometimes opposite conditions of the eye or of the system, on which the amaurotic affection depends. I repeat, unless I adopt this mode of procedure, my readers will be perplexed with a sort of general description of almost every symptom of almost every disease to which the human body is liable—a description of symptoms bearing perhaps in one or two particulars a slight resemblance to every case but being accurately descriptive of, and strictly applicable to, none.

A.—*Pathological conditions of the retina and neighbouring parts, connected with and inducing amaurosis:*—

1. The susceptibility of the retina may be at once and directly depressed, without going through the process of inflammation and sustaining its consequences, in the same way as the nervous power of other parts of the system may be lowered or taken away by powerfully depressing and rapidly enervating agents.

2. The impressibility of the retina by light may be lessened by an increased fulness of its vessels, as happens in the second stage of inflammation; or by actual dilatation of them, as occurs during chronic retinitis and as the consequence of long continued inflammation.

3. The retina is also liable to become compressed by dilatation and varicosity of the choroid vessels, by an increase in the quantity of the vitreous fluid, and by sub-sclerotic and sub-choroid dropsy.

4. Inflammation of the retina may lead to various morbid states of that tunic competent to destroy or impair its susceptibility to light, such as thickening, induration, and opacity of its texture, and preternatural adhesions to other parts.

5. The texture of the retina may become softened, ossified, flaccid, or, from diminished plenitude of the globe, thrown into rugæ or folds, or it may be atrophied or entirely absorbed. It may be the seat of malignant disease, vesicles or hydatids may be formed in its texture, or it may never have been formed at all, or it may have been merely imperfectly developed.

6. Vision may also be impaired by various changes in the quality or a diminution in the quantity of the choroid pigment.*

---

* Observations on, or cases illustrative of, the occurrence of amaurosis from morbid changes in the retina or atonic or varicose enlargement of its vessels have been made, referred to, or related in detail, by

B.—*Pathological conditions of the optic nerve connected with, and leading to, amaurosis:*—

1. The optic nerve may be subjected to compression at various parts of its course, and particularly by some change in the ossific structures in and near which it passes. Its texture may also be expanded, and furnish a sort of cist to a tumour originally developed between its fibrillæ.

2. It may also be exposed to various sources of mechanical irritation from irregularity, mal-formation, or disease of the bony structures in its neighbourhood; or it may be elongated, or it may be distorted in its direction.

3. It may be the seat of organic change, such as atrophy, ramollissement, growths in its substance, effusions or growths between its membranes or among its fibres, such as cists and hydatids. Its vessels may become varicose; pus may be deposited in the centre of the optic nerves, or they may be the seat of ulceration, of malignant disease, or of various adventitious deposits, such as earthy (Walter, Morgagni) and albuminous matters (Ferro.)

4. The neurilema of the optic nerve may be inflamed, or thickened. I have seen an hypertrophied state of the neurilema of the optic nerve in a degree which has caused the absorption of a great part of the nervous matter it enveloped.

5. The optic nerves may never have been developed, or one only may have been developed, (Malacarne, Voigtel, Andral) and this may occur even though the eye or eyes may have been formed. Magendie found the retina developed in a dog, although he could discover no trace of an optic nerve.*

---

Boerhaave, Morgagni, Plouquet, Husinger, Prochaska, Hecker, Rousseau, Walter, Beer, Magendie, Larrey, Demours, Wardrop, and Vetch.

* Cases or remarks illustrative of the occurrence of amaurosis from disease of the optic nerves or their sheaths, or from the development

C.—*Pathological conditions of the brain or of its membranes sometimes connected with, and occasionally leading to, amaurosis:*—

Amaurosis may be caused by compression of the brain in whatever way that pressure may be produced; by disease of the thalami optici or some neighbouring part;* by atrophy and ramollissement of its medullary structure; and by lymphatic, purulent, serous, sanguineous, or other effusions and depositions in various parts of the brain, and especially at the origin or along the course of the optic nerves. Tumours in, and various fungoid degenerations of, the texture of the brain, sometimes give rise to amaurosis. And finally, in the examination of some amaurotic patients, the only changes detected after death having the remotest connexion with the loss of vision, are found in the pineal and pituitary glands (De Haen, Vieussens, Rayer, Gendrin, Leveque, Rullier, Wenzel, Ward, Magendie, Mackenzie).

I shall not stop to detail the infinite variety of morbid conditions of the encephalon and its membranes which may give rise—which are adequate and which are known to give rise—to amaurosis; it will be sufficient to mention that an amaurotic affection is frequently produced by many disordered and diseased states of the encephalon and its investing membranes, and by a defect in the development of particular parts of the brain.†

---

of tumours in their texture, or in the immediate neighbourhood of their texture, have been recorded by, Bonetus, Vesalius, Platerus, Bidloo, Ballonius, Rolfincius, Paaw, Kaltschmidt, Morgagni, Wandeler, Boerhaave, Walter, Ferro, Gallereux, Cesalpinus, Sauvages, Mead, Cheselden, Beer, Bichat, Baillie, Larrey, Heaviside, Burns, Langstaff, Brown, Monteath, Andral, & Christison.

* Andral says "blindness is rarely produced by any of the various and frequent alterations of the thalami." *A treatise on pathological anatomy;* translated by R. Townsend and W. West, Dublin, 1831, Vol. ii. p. 795.

† Cases or remarks proving or illustrating the production of amau-

D.—*Pathological conditions of various nerves which are essential to the integrity of the eye, and subsidiary to the function of vision, sometimes causing amaurosis:*—

Under this head or division of the seat and the pathology of amaurosis, may be included, functional derangement, organic disease, compression or injury of the third, the sixth, and the branches of the fifth pair of nerves, and also the lenticular ganglion. I need scarcely mention that almost every cause which is capable of disturbing the function of other nerves may operate upon thöse I have just mentioned, and it is unnecessary to enumerate these causes.

E.—*Pathological conditions of various parts of the system occasionally productive of amaurosis:*—

Under this division of our subject may be included the irritation of dentition; various forms of gastric and intestinal disorder, disease, or irritation (Vandermonde, Stoerk, Fabre, Thilen, Ribes, Beer, Wardrop, Jourdan, Richter, Scarpa, Demours, Schmucker, Travers, Lawrence); and certain conditions of the uterine system, and particularly suppressed menstruation, as has been pointed out by many excellent writers on ophthalmic maladies, and especially by L. Winslow, Pechilui, St. Yves, Richter, Scarpa, Schmucker, Demours, and Guthrie. An enfeebled state of the body generally, or a torpid condition of the nervous system in particular, general nervous excitement and irritation, may also be placed among this class of the causes of amaurosis.

Suddenly excited and violent passions or emotions of the mind, such as fear (Richter, Scarpa, Wardrop),

rosis from tumours or abscess in the brain, have been published by Bidloo, Plater, Kühl, Bonetus, Pelargus, Peyronie, Schaarschmidt, Ford, Ballonius, Villeneuve, Thomann, Baillie, Beer, Langstaff, Morrah, Abercrombie, and Travers.

anger, (RICHTER, BEER, DEMOURS,) grief, (HERCULANUS, HEISTER, BEER, SCARPA, TRAVERS,) and disappointment, are adequate causes of amaurosis.

Gout, syphilis, scrofula, and rheumatism, have been placed among the causes of amaurosis, and also the suppression of any customary discharge, such as a periodical bleeding from piles (BEER, RICHTER, SCARPA, SCHMUCKER); the too rapid healing of an old sore (TIMÆUS, WARDROP, BEER, TRAVERS, FRICK); and the sudden retrocession of an extensive cutaneous eruption (SENNERTUS, BAGLIVI, HOFFMAN, ST. YVES, BEER, DEMOURS, SCARPA). Deficient circulation of blood in the eye, from disease (especially ossification*) or compression of the ophthalmic artery, from the tying of the carotid artery, &c, *may* also occasion amaurosis.

Such, then, is a statement of the varied seat of amaurosis, and an enumeration of some of the causes—predisposing and remote, exciting, efficient and immediate—which give rise to it;—an epitome, a mere outline of its pathology. If we bring general pathology to bear upon this subject, we find that the separate and detailed recital of all the causes of amaurosis would involve the enumeration of an almost endless catalogue of morbid conditions.

*Various circumstances connected with the history of amaurosis.*—Amaurosis usually attacks one eye first, and does not commence in the opposite organ until the vision of that in which it first appeared is either much impaired or totally destroyed; it is by no means an usual occurrence for amaurosis to take place in each eye at the same time, and to advance in both with an equal progress.

---

* M. DEMOURS, after having related a case of imperfect amaurosis of the right eye attended with "des mouches noires," proceeds to remark "il me fut amené par mon collégue, M. NAUCHE, qui me dit qu' à l'ouverture du cadavre, on avait trouvé l'artère ophthalmique droite ossifée." Tom. i. p. 391.

Still, however, it must be admitted, that this matter will be mainly determined by the nature of the cause inducing the amaurotic affection. Sometimes the sight of one eye is completely destroyed by an attack of amaurosis, the other remaining perfectly healthy throughout the life of the individual; in other instances, the healthy organ may become affected just as the vision of the diseased eye is nearly destroyed, or the amaurotic tendency may be decidedly evinced at some future period.

Amaurosis is said by L. WINSLOW, BEER, WELLER, and SANSON, to take place most frequently in eyes of a dark colour, and very opposite statements have been made upon this subject by men of acknowledged experience; I apprehend, however, the mere colour of the eye does not much influence the occurrence of amaurosis.

*Age at which amaurosis most frequently appears.*—Amaurosis may take place at any period, and it is generally represented by ophthalmic writers to occur by far most frequently at the middle period of life, and, I apprehend, this statement is correct with respect to the more severe and incurable forms of amaurosis; but there are certain ages at which, from particular circumstances, it is most commonly witnessed, and for the most part merely as a functional or sympathetic affection. In the first place, it may be congenital with or without being evinced by any defect in the form or the magnitude of the eye or any of its parts, although the globe generally acquires, under such circumstances, a rolling or unsteady motion.*

Amaurosis may be produced by hydrocephalus, (which disease occurs most frequently in children) by convulsions, or by the irritation connected with dentition, or by the presence of worms in the stomach or intestines. These are the circumstances associated with very early life with which amaurosis is most commonly connected. At the period of puberty it is sometimes induced by vitiated habits and by certain conditions of, and changes in, the genital system. Again, the periods of pregnancy and suckling are favourable to its origin; the former, by the pressure of the gravid uterus upon the large venous trunks, and the latter, by enfeebling the system generally, and very probably also by over exciting and deranging that sympathy which exists between the uterus, the mammæ, and the retina, and with the precise nature of which we are not fully acquainted. The final cessation of menstruation is the next season at which amaurosis is most likely to take place; and lastly, extreme age is a strong predisposing cause of amaurosis. Such are the general circumstances which render the occurrence of amaurosis especially frequent at certain ages and periods of life.*

---

* This variety of amaurosis (*amaurosis congenitalis*) has been referred to, or discussed in a more or less elaborate manner, by ST. YVES, SAUVAGES, ANDRAL, TRAVERS, MAGENDIE, LUCAS, LAWRENCE, MONTEATH and MACKENZIE.

Amaurosis, then, may exist as a congenital disease—it may occur at any period of life from infancy to old age—it occasionally attacks both eyes—it occurs sometimes only in one, sometimes in both eyes—its progress may be slow or rapid—it may be years in destroying vision, or the sense of sight may be lost almost instantaneously.

It will be evident from the preceding general observations on amaurosis that it is attended by a great variety of symptoms, and that its causes in particular cases can only be correctly ascertained by patient inquiry and diligent investigation, conducted in a systematic manner.

---

* There exists in some families an hereditary prediposition to amaurosis, so that several of the members of such families will be, at some period or other of their lives, the subjects of this calamitous disease, my practice has furnished me with many examples of this description and the fact is circumstantially verified by the statements of BEER, WELLER, BROWN, DEMOURS, LYALL, and MONTEATH.

*Mode of examining the eye of a person suffering from amaurosis.*—In examining a patient affected with amaurosis the surgeon would first investigate the condition of the eye and its palpebræ; he would observe whether or not the upper lid drooped, whether there was any degree of strabismus, and whether the sympathetic and associated movements of the eyes were unaltered; he would then notice the state of the cornea, its clearness and its form; he would observe the state of the pupil, its size, its figure, its degree of motion, and also the distance of the iris from the cornea, as well as its colour and the general appearance of its texture, and whether it be convex or concave, or preserve its natural plane; he would then observe the state of the humors in reference to their transparency or otherwise, and particularly notice if any deep-seated, shining, buffy or dusky-cloudiness were present; and lastly, he would notice if the eye-ball were increased in vascularity, or changed in colour or figure, and whether or not it was enlarged, or softer, or more tense than it ought to be.

With regard to the mode of examining the pupil I may remark, that it is necessary to note the effect of belladonna upon it, and examine the eye under its influence, if, indeed, the use of that narcotic do exercise any influence upon it; to examine it in various degrees of light and in connexion with the pupil of the opposite eye; to observe the state of the pupil when the lids of both eyes are suddenly separated, and also when the lids of the sound organ are closed, and those of the diseased eye are separated, and then observe each pupil separately, by the aid of those manœuvres ordinarily employed for the purpose of ascertaining their extent and facility of motion. I do not mean to say that the nature of the prognosis would be absolutely decided by the immobility or the activity of the pupil, but that the state of the pupil is to be borne in mind, in connexion with other circumstances, in determining the character of the prognosis. The pupils of some amaurotic patients play with the most lively freedom when the degrees of light to which the eyes are exposed are suddenly contrasted, but sometimes, as JANIN long since remarked, when the retina of both eyes is equally insensible to light, when the amaurosis is equally complete in both eyes, the iris will be differently acted upon by the light, so that the pupil of one eye will be larger and its motions livelier than those of the other.*

In examining the state of constitution of an amaurotic subject (for nothing more than very general rules can be laid down by an author,) the attention should be particularly directed to the elucidation of the following circumstances. What have been and what are now the patients' habits? What is the state of the patient as regards his habit of body? What is the state of his mind and of what disposition is he? Is there present any visceral disease, and if any what is its nature? Is there present any source of temporary disorder in the alimentary canal? Is he suffering or has he been recently suffering from gout, rheumatism, scrofula, or syphilis? Has he passed through any severe mercurial treatment? Has he suffered from apoplexy, epilepsy, paralysis, severe fever, inflammation or concussion, or other injury of the brain? It may be right also to add the following queries:—How long has the disease existed? Have any remedies been employed for its cure, and, if any, of what nature and what has been their effect?

---

* I take this opportunity of observing that I have, on several occasions, shown to my professional brethren persons suffering from amaurosis in a decided form in one eye, and only in a very slight degree in the other, in whom it was remarked that the mobility of the pupil, as tested in various ways, was much more considerable in the most diseased eye. The irritability of the iritic texture to light, and the impressibility of the retina by the influence of the same agent, do not by any means always correctly correspond.

Although it is not possible for me to lay down any specific rules for the practitioner's guidance in conducting the examination of amaurotic patients which will be suited to *every* case, I may safely assert, that by adopting a systematic method of investigation based on these principles and governed by these suggestions, he will be much more likely to ascertain its true cause and precise seat than he would be if his examination were conducted without any definitely and methodically arranged system.

*Symptoms.*—The first symptom of amaurosis is dimness of vision, for we do not recognize the disease as *amaurosis* unless it be attended with at least an imperfection of sight, popularly termed "a weakness of the eye." This dimness of vision may be at first exceedingly slight, so as to be only perceived after the organ has been employed a short time in reading or in some avocation requiring minute vision; the eye is weak in the estimation of its owner because the sight is rendered dim and imperfect after it has been, for some length of time, closely exercised. This dimness of vision increases, objects appear cloudy, or as though enveloped in smoke, the sight is at all times extremely indistinct, and is totally lost after the eyes have been employed for a short period. The outline of objects appears to be confused or is wholly lost, small objects appear to run together, to crowd, as it were, into a confused mass, and the patient can only restore to himself the capacity to "make them out" at all clearly and distinctly, by resting the eye for a short period. For instance, if a person so affected were reading, in a short time the letters would "seem to run together," the spaces between separate words would not be perceived, so that each line would appear to consist of one long word; and if he still further prolong his efforts to read, he discerns little more than a number of dark marks upon a light-coloured surface. This is the progress of a case of simple amaurosis in which vision is gradually destroyed by causes producing an atonic state of the retina. But some amaurotic patients are annoyed by the bright light of day, it would seem as though the sensibility of the retina were increased, although the power of vision is greatly diminished; but this is usually nothing more than an early symptom of only some few varieties of amaurosis; it does not continue so as to constitute one of its latter symptoms.

This condition of photophobia is wholly unconnected with retinitis, and although it is relieved by protecting the eyes from bright light, the moderated measure of light does not restore to the organ perfect vision—the sight is, in fact, impaired in a greater or lesser degree, although, from the degree of intolerance of light which is present, it might be inferred that the sensibility of the retina was increased in a manner which was wholly inconsistent with the existence of impaired and cloudy vision.

In the course of some forms of amaurosis certain peculiarities of vision are observed, which it is necessary to mention. Luminous spots or scintillations may be noticed by the patient, and are always considered among its worst symptoms as frequently indicating some change in the texture of the retina itself. Persons suffering from amaurosis sometimes mention among the early and distressing symptoms of their malady, the presence of scintillations, which appear to pass continually from the centre of the eye, in a lateral, an upward or downward, or a distinctly radiated manner, pretty much as sparks fly from a piece of hot iron when forcibly struck with a hammer. One or two spots generally of a dark dusky hue are seen by the patient in some cases; there may be a scotoma merely, or there may be many of them, constituting the muscæ volitantes. These appearances are very various, but I have often heard persons describe them as though a series of small semitransparent beads or minute vesicular bodies were connected with a fine thread, the beads or vesicles being pretty near together but not quite regularly so, being sometimes in apparent contact for a short distance, then nearly in contact, then a wider space intervening between them; and instead of the whole series consisting of these vesicular bodies of an equal size and the same figure, a larger and denser body is as it were introduced among them at irregular and uncertain distances. These threaded beads or connected vesicular bodies sometimes form irregular curves, but more commonly pass directly upwards or downwards or to either side almost incessantly, their motion and the distinctness with which they are perceived being increased by the movements of the eye or the body, by over exertion of the eye, by passions and emotions of the mind, by anxiety, and so on. Sometimes, however, they pass so slowly that they may be said to be almost stationary, but they may appear to course before the eye very rapidly. A very talented gentleman (MR. DODDS) connected with the Horseley Iron Works, who has suffered a good deal from these appearances, has been at great pains to delineate them for my information; various other persons who have consulted me have adopted the same mode of making me acquainted with this part of their symptoms, and, in the preceding remarks, I have endeavoured to copy their representations and to use the language they have employed to express to me their sensations.

Sometimes the patient will complain that he can only see the half of an object distinctly, the other half of it being totally concealed from his view, unless he change the direction of his eye, this is termed *visus dimidiatus* or *hemiopia*, and is generally, but certainly not always, produced by a partial state of disease of the retina, and almost invariably from some organic and irremediable change. Some persons can see separate and single objects very distinctly, and in reading can distinguish every word when selected for separate examination, yet when reading sentences pretty rapidly they miss perhaps one or two words in each line, and this defect has been designated *visus interruptus*. The patient's vision may make objects appear distorted or may represent them of a colour different from that they really possess, and these defects are respectively called, *visus defiguratus*, and *visus coloratus* or *chrupsia;* and when objects are seen as through a piece of gauze, as though a film pierced with various apertures were placed between the patient's eye and the object he is inspecting, the state of his vision has been termed *visus reticulatus*. Again, objects are sometimes seen of an increased size *(visus magnificatus)*, and SAUVAGES speaks of a woman who laboured under this defect to so great an extent that a fly appeared as large as a hen, and a hen as large as an ox. Then again, there are conditions of vision which are intelligibly enough expressed by the terms *visus oliquus*, *visus multiplicatus*, and so on. These are distinctions and variations which it is desirable to be acquainted with, it is, in fact, necessary that a surgeon should know that persons suffering from amaurosis may view objects as though their distance, their colour, their situation, their relative position, their form, their number, their connexion, &c. were different from what they would appear to be in a perfectly healthy and normal condition of vision. The treatment would not, however, be regulated by these varieties in the symptoms; the *visus reticulatus* or *visus defiguratus*, or any of the other peculiarities of vision I have just referred to, would not in themselves direct and decide practice.

When the centre of the retina is totally insensible its circumference may retain a certain degree of susceptibility, and on this account it will be observed that some amaurotic persons see objects laterally tolerably well although they cannot see them at all if placed directly in front of the eye. There is, however, another reason why they occasionally view objects laterally—the disease may be attended with, or may in some manner or other have induced, myopia, and many experienced writers on gutta serena mention near-sight among the occasional symptoms of this disease.

*State of the pupil and the iris.*—The pupil is not always circular in amaurosis, nor does it always retain its proper central situation, but no irregularity in these respects, that is, either as regards its central position or its circularity, are necessarily connected with an amaurotic affection. Beer mentions, as one of the distinguishing characters of amaurosis, that the pupil is drawn upwards and inwards. The pupil is naturally clear and black, the transparent retina permits the stained choroid to be seen through it, which gives to the pupil that beautifully clear black appearance noticed in a perfectly healthy state of the eye; but in amaurosis it may be dull and cloudy; if the vitreous humor be changed in colour the pupil will assume a corresponding change in its colour; if the retina be rendered partially opaque by inflammation, the pupil will be of a light dingy-brown colour, just as it is when the choroid pigment is deficient; and, I may observe, that deficiency of the choroid pigment is admitted by BEER, TRAVERS, VETCH, LAWRENCE, COOPER, FRICK and MACKENZIE, to constitute the occasional cause of amaurosis. Sometimes the iris appears to be drawn backwards, it seems as though its ciliary border had shifted its position and was attached to the sclerotica at a certain distance behind the corneal margin; in some instances its ciliary margin appears to be properly and naturally placed, but its pupillary border is a little drawn towards the retina, so as to form, if I may be permitted the comparison, a very small and exceedingly shallow funnel, its point being directed towards the optic nerve.

The pupil is generally much enlarged, and almost invariably so in those forms of amaurosis which are induced by any cause producing a virtual compression of the brain, but there are some forms and conditions of amaurosis which are attended with a contracted state of the pupil, and with the absolute or almost absolute destruction of vision, and there are conditions of the eye in which a state of mydriasis exists in connexion with pretty perfect vision.*

The mobility of the pupil is next to be investigated, and it should be examined, first, after the application of belladonna, and as far as it is capable of being placed under its influence; and secondly, in various degrees of light. The iris, as I have before remarked, acts in obedience to the impression of light upon its surface, and by sympathy with the retina and with the iris of the opposite eye, and this latter action is termed its associated action. Its associated action may remain when its sympathetic action with the retina and its susceptibility to the direct agency of light upon its irritable texture, are both destroyed, and although there is very little positive and precise information to be gained by the continuance of the perfect mobility of the pupil, it is always a favourable symptom, as far as it goes, when that mobility is retained. We should regard as a favourable symptom the continuance of the perfect mobility of the pupil, but by no means pronounce a case to be hopeless in which its mobility was lost.* It will be sometimes remarked that the colour of the iris is changed, and if this occur in connexion with a morbid state of the pupil it would be especially requisite to endeavour to ascertain the condition of the posterior tunics. Again, if it be pushed towards the cornea so as to present a convex surface anteriorly, and if, at the same time, the pupil be dull and muddy, and the eye-ball unusually firm and tense, we should infer unfavourably of the case, inasmuch as, certain mischief to the septa of the vitreous humor, and a permanently atonic condition of the retina from prolonged compression, may be expected to have occurred. Atonic amaurosis is often accompanied by a soft, flaccid state of the globe, and this is always an unfavourable symptom—vision is rarely ever restored or preserved where this state of the eye-ball exists. Sometimes there will be deep-seated pain in the eye-ball, particularly after any attempt at exerting the eye, but it does not constitute a frequent or prominent symptom, and I only wish to mention it as being an occasional accompaniment of amaurosis.

---

* "I have seen a few instances of gutta serena where the pupils were greatly contracted. I will further add, that, though dilated pupils be almost always a symptom of the gutta serena, yet every dilated pupil is not a certain sign of this disease." *A description of the human eye, together with their principal diseases*, by JOSEPH WARNER. London, 1773, page 32.

---

* I beg to call the readers' attention to the facts that M. Ribes and others, who have devoted much time to the anatomical investigation of the nervous system, have detected the transmission of a few delicate filaments to the retina from the lenticular ganglion, which are much firmer than those distributed to the iris, whilst the indefatigable Bork has demonstrated the delicately filamentous connexion subsisting between that ganglion and the great sympathetic.

Pain in and around the orbit and tenderness of the scalp, strabismus, double vision, ptosis, a want of correspondence in the motions and in the direction of the eyes, a tremulous, vacillating, or rolling motion of the globe, and a peculiar vacancy of countenance, are also occasional accompaniments of amaurosis.

Various other symptoms are occasionally complained of, but I cannot connect them as pathognomonic signs of any particular form of amaurosis, neither are they frequently complained of, and it seldom happens that the same individual suffers from more than one or two of them. These anomalous and occasionally occurring symptoms, are, a sense of dryness or an aching of the eye; a feeling as though sand or dirt were upon its surface; occasional darting pain in the globe, and sometimes a feeling as though it were forcibly protruded from the socket; sometimes also its colour is changed, if not increased in vascularity or attended with varicosity of its superficial vessels, the sclerotica will have acquired a pale dirty-white, brown, or yellowish tinge.

I know it is usual to describe the symptoms of amaurosis more in detail than I have now done, and to connect a *particular* set of symptoms with a *particular* form of amaurosis arising from a *particular* class of causes and morbid conditions of parts which are subservient to the purposes of vision;* thus it will be explained by those who adopt this tedious and zigzag plan of enumerating the symptoms of amaurosis, that a sort of gauze is before the eye in one form of gutta serena, a thin mist or cloud in a second, a single black or shining spot in a third, an iridescent appearance in a fourth, and so on with respect to all the other symptoms of amaurosis, but really this is very tiresome and unnecessary, and I think quite impossible to be done by any person whose fancy is not more active than his judgment is sound and his practical knowledge extensive, for there are scarcely any two cases even of the same species of amaurosis alike with respect to all, or, as I may term it, the entire detail of their symptoms. I shall draw attention to all the distinctions of this nature which I consider it practicable to make and important to be borne in mind when I enter upon the illustration of certain forms of amaurosis arising from a particular set or character of causes.

---

* A very successless attempt of this nature has been made by Dr. Copland, in his excellent and laboriously compiled *Dictionary of Practical Medicine.* I apprehend nothing can be more absurd than the manner in which he has endeavoured to show that " amaurosis arising from disease of the optic nerves, or of their sheaths," (including all their morbid conditions from simple atrophy to acute inflammation) is uniformly or generally attended by a given set of symptoms. Can we

*Progress of amaurosis.*—Amaurosis varies in its progress, so that the patient's vision may be very slowly destroyed, or it may, of course, disappear very rapidly, and instances are upon record, and such I have myself seen, where a sudden flash of lightning or some violent passion or emotion of the mind has caused the almost

---

for a moment suppose that atrophy of the optic nerve and inflammation of its neurilema will produce the same symptoms, even as far as relates to the organ of vision? There are certain pathological conditions of the optic nerves which will give rise to symptoms of amaurosis much more nearly resembling those produced by certain diseased states of the retina, than by those occasioned by various other affections of the optic nerves. If the symptoms enumerated by DR. COPLAND, as constituting, as I suppose, the pathognomonic signs of "amaurosis from disease of the optic nerves and their sheaths" were not selected from what he would term "competent authority," it would be justifiable to infer that they were either guessed at or set down at random. Various opposite affections (opposite as respects their strict pathological dependence) cannot surely be all evinced by precisely the same signs or set of symptoms.

instantaneous destruction of vision. Its ordinary rate of progress is rather slow, it may take years from the commencement of the disease to destroy the power of vision altogether; this, however, will be mainly influenced by the nature of the cause which gives rise to it. **Bonetus** speaks of the sudden occurrence of amaurosis after the opening of the frontal vein. **Herculanus** states that a woman became quite amaurotic in the course of one night from excessive grief occasioned by the death of her son. **Boerhaave** mentions the case of a young man who became instantly blind on the emission of a drop of fluid from a spider which fell upon the surface of his eye. **Richter** knew a man who became suddenly blind whilst carrying a heavy weight. **Bartholin** relates the case of a monk who lost his sight as often as he shaved his beard, and recovered it again when the beard began to grow. **Demours** relates the case (Observation, 340) of a woman who became suddenly amaurotic after a fit of passion. **Dr. Powell** mentions an instance of sudden loss of vision, preceded by an acute cephalæa, in which an emetic was found, during the act of vomiting, abruptly to restore sight in the right eye (for both were affected) with a sensation as if a flash of lightning had taken place, but the vision was soon lost again. "I have seen," says **Mr. Lawrence**, "a few instances in which persons having gone to bed with perfect sight, have been totally blind the next morning." **Richter**, **Beer**, **Jourdan**, **Wardrop**, and **Lawrence** have known instant blindness produced by a vivid flash of lightning.*

**Causes.**—I have already alluded to some of the causes of amaurosis in the course of my remarks on the seat of this affection and the pathological conditions of various parts connected with it, but I have not stated them either fully or minutely or described them at all in detail, and perhaps I have not paid due attention to the classification of them, so as to bring sufficiently under consideration in separately arranged groups, those of them which are usually (not, however, always correctly) designated *predisposing*, *exciting*, *immediate*, *remote*, *efficient*, and so on. I shall endeavour to group and assemble these causes together, and to connect them with and to refer them, as far as I legitimately can do so, to different heads or divisions which will comprise those various pathological conditions of the eye, of its appendages, and of the brain and various other parts of the system, which are so well known to give rise to amaurosis.

---

* **M. Sanson** says "a flash of lightening has in some cases cured an asthenic amaurosis."

Acute or chronic inflammation of the retina may induce amaurosis either by the increase of its circulation, the distention of its vessels, or through the medium of its effects; and amaurosis produced by retinitis, whether acute or chronic, or that degree of imperfect vision which attends the progress of these affections, is accompanied by scintillations and very generally by *interrupted vision*. There is an excitement of the vascular system of the retina and a distention of its vessels produced by a great variety of causes, and they may be termed the proximate causes of the amaurosis, the actual excitement or distention constituting the immediate or efficient cause. Among these causes may be mentioned long-continued exercise of the eye upon minute or shining objects by a bright light, the inspection of objects, and particularly luminous ones, through powerful glasses, and lastly, using the eyes excessively with the body in a bent or constrained position, as happens with tailors, shoemakers, and other "operatives." It is probable also that the various forms of gastric and intestinal irritation, the various states of the uterine system previously mentioned, the pressure of the gravid uterus in the latter stages of pregnancy[*] (mentioned by Morgagni, Rolfini, Schmucker, Portal, Beer, Weller, Frick, Cooper) and a great variety of other sources of obstruction to the return of blood from the eye or the head, or of irritation, such as that produced by a carious tooth, &c., operate by exciting this state or rather these states of the vascular system of the retina, namely, by increasing the activity of the circulation or by inducing permanent enlargement of its vessels.[†] Various morbid affections of the brain, of the stomach and bowels, and of the uterine system, produce an irritability or an excitement of the retina, but these are conditions which alone do not involve, as it appears to me, the occurrence of amaurosis; if the retina be merely irritable, if it be merely excited, serious dimness of vision does not result, in fact, some other change must take place before decided amaurosis can occur, which change I should prefer to consider the effect of the previously induced alteration in the state of that nervous expansion. So that the retina appears, as respects its relation to vision, to pass through a series of changes, before it is competent to produce and constitute perfect amaurosis. But the cause of the defect may act more powerfully, it may be sudden, so instantaneous indeed, that the part cannot experience any proper impression after having sustained the operation of the morbid agent that destroyed its sensibility. The retina may be the seat and subject of compression merely—compression unattended by any present or previous state of excitement—and it may be produced by the pressure of the lens in the operation of depression, or by the accidental dislocation of the crystalline; by the atonic enlargement of its vessels or of those of the choroid; by an increase in the quantity of the vitreous humor, by sub-sclerotic and sub-choroid dropsy, and other morbid states of a like nature.

---

[*] "J'ai été consulté par des femmes qui, pendant chacune de leurs grossesses, éprouvaient une amaurose plus ou moins complète jusqu' après l'accouchement." *Traité des Maladies des Yeux;* par A. P. Demours, T. i. p. 380.

[†] "Quelquefois il arrive qu'en examinant le fond de l'œil avec attention, on y apperçoit une large surface concave et blanche sur laquelle se voient distinctement ramper de nombreux vaisseaux sanguins." Article "goutte sereine" in *Dictionnaire des Sciences Médicales*, p. 276.

Atrophy or suppuration of the optic nerves[*] and various morbid changes in their texture or in that of their enveloping membranes, diseased growths in the texture of the optic nerves,[†] and effusion or deposition between its membranes, and morbid changes in the ossific structures in and near to which the optic nerves pass, are among the causes of amaurosis.

Various morbid states of the brain and its vessels, and particularly of that part of them around the origin or along the course of the optic nerves, (Ware, Brown,) may give rise to amaurosis, and, generally, by producing upon them a certain degree of pressure. Another class of causes appears to operate by gradually impairing or suddenly destroying the sensibility of the retina; such are the loss of a large quantity of blood (Richter, Beer, Jourdan, Scarpa, Sanson, Travers, Frick); excessive diarrhœa (Richter, Beer, Mackenzie); profuse salivation (Richter, Travers, Beer, Weller); venereal excesses; protracted suckling; menorrhagia; extreme senility; great bodily langour and debility; fear, grief, and various other depressing passions; the inspection of an intensely bright object through a series of powerful glasses; exposure of the eye to a flash of lightning or to some very vivid and suddenly excited light,* such as the ignition and explosion of a quantity of gun-powder.

---

[*] "Je mis le nerf optique à découvert; j'en incisai la gaîne, et je le trouvai, dans presque la moitié de son étendue, comme tombé en suppuration, et réduit en une matière liquide d'un blanc-sale." Gallereux in Demours' *Traité des Maladies des Yeux*, T. i. p. 75.

[†] "La dissection du globe de l'œil ne fit découvrir aucune altération dans cet organe. Le nerf optique fut mis à nu. Je trouvai, dans le milieu de son corps, un petit tubercule d'une consistance assez dure, d'une couleur grisâtre et un peu plus gros qu'un grain de chenevis." Gallereux in op. cit.

Amaurosis has been known to occur from severe vomiting, (BANISTER, BEER, RICHTER, WELLER, VETCH ;) from violent sneezing, (ETTMULLER, HILDANUS, WELLER;) from blows upon the eye or head, without producing any inflammatory or visible change in the eye to account for the blindness, (SAUVAGES, RICHTER, DEMOURS, DUPUYTREN, WELLER, JACOB, WARDROP ;) and from suddenly applied pressure upon the eyes (BEER.)

DIAGNOSIS.—There are two diseases of the eye with which amaurosis may be confounded unless pretty close attention be paid to diagnosis—namely, cataract and glaucoma. With regard to glaucoma it is by no means unimportant that the diagnosis be accurate, and it is also of the greatest consequence to the patient's welfare, that an amaurotic defect of vision should not be mistaken for the commencement of cataract, lest the time during which active treatment could be employed with advantage be either wholly lost or mischievously employed.

It is not possible to confound a pure and mature case of cataract with one of simple and complete amaurosis, but the incipient stages and anomalous forms of these maladies *may* give rise to some doubt and difficulty. At the early stages of cataract, there is sometimes present a slightly dilated and sluggish state of the pupil, muscæ volitantes, and impaired vision, with only the merest cloudiness of the lens, and I have seen instances of this kind in which it has been impossible to determine that a slightly atonic condition of the retina was *not* the cause of the dimness of sight. In old persons in whom atony of the retina at its early stages supervenes on a cloudy state of the humors of the eye, I am satisfied that no surgeon can, in every case, be prepared to say that the progress of the case will determine the occurrence of the one of these diseases in preference to the other. In neither case is there either usually or necessarily present any pain in the eye-ball or the head, any tension or increased plenitude or inflammation of the globe, any vacancy of countenance, strabismus or confirmed amaurotic stare, and it is perhaps doubtful if there is present any greater degree of dimness of vision than the cloudiness of the humors alone would be sufficient to occasion. If the pupil is *very* much dilated, if its mobility is *nearly* destroyed, if scintillations are present, and if the patient has recently been exposed to the operation of circumstances calculated to induce atonic amaurosis, then the character of the diagnosis would be determined with comparatively little difficulty. The progress of the case will, however, soon determine the nature of the disease. In many cases of amaurosis occurring in early life, the disease is pretty accurately connected with its cause, the attack is more sudden and the progress more rapid than that of cataract, there is an absence of all cloudiness of the pupil, which is dilated and nearly motionless. The history of the case, if correctly and completely elicited by proper inquiries, the presence of various anomalous symptoms—such as pain in the eye or the head, dryness of the surface of the eye, a scratching or itching sensation of that organ, tension of the globe, &c. —will furnish the grounds of arriving at a correct conclusion respecting the nature of the affection. I am satisfied that the only circumstances which can render it difficult to distinguish cataract from amaurosis are, when mere atony of the retina or atrophy of the optic nerve *commence*, and especially when these morbid states supervene on a cloudy state of the pupil; and in every such instance, where the slightest doubt in reference to the particular cause of the impaired vision exist, it is obviously proper to cause the patient to abstain from actively using the eye, or doing any thing calculated to impair the tone of the retina, or of the system. Cataract and amaurosis may commence pretty much at the same time, and may advance together; or cataract may occur in an amaurotic eye; or amaurosis may take place in a cataractous one. In the first place, difficulty may exist if we are unable to discover any manifest cause of the amaurosis, and if the variety of amaurosis depend on an atonic condition of some part of the visual apparatus. In this combined affection there is not the capacity to distinguish suddenly contrasted degrees of light, there is often present a much enlarged and immoveable pupil, and probably also scintillations, or, what is rare in the latter stages of simple uncomplicated amaurosis, muscæ volitantes. I shall only further remark, that whenever a case is doubtful—whenever we cannot readily determine if it be one of cataract or one of amaurosis—it is most desirable to watch its progress with great care, so as to notice every deviation it may present, and to act under the supposition that the case is one of amaurosis, and to adopt the precautionary measures suited to that variety of the latter affection we may suspect it to constitute.

---

* "GALIEN a vu des curieux qui, en examinant avec trop d' attention des taches du soleil, perdirent la vue par des amauroses complètes." DEMOURS. *Traité des Maladies des Yeux*, T. i. p. 371.—See also, in the third volume of the same work, a case of "amaurose sans lésion apparente du globe, survenue en examinant une éclipse de soleil."—"Un autre encore fut privé de la faculté visuelle pour avoir, en se livrant a de profondes méditations, fixé pendant quelques minutes ses regards sur la lune dans son plein." JOURDAN in *Dic. des Sciences Médicales*, Tom. xix. p. 284.

When an eye is affected with glaucoma there is an evident change in the transparency of the vitreous humor, the globe of the eye is tense, the state of vision corresponds in the general, at its early stages, with the extent and degree of visible opacity, and the opacity itself is first noticed at the bottom of the eye, but it gradually approaches and sometimes implicates the lens; the iris has generally a convex appearance, and is obviously pushed towards the cornea; scintillations, muscæ volitantes, &c., are not present; but it will be remembered, that the two affections may be combined. So far, then, it does not seem probable, that a case of pure inflammatory glaucoma can be confounded with many forms of amaurosis, and especially the atonic variety of amaurosis, that depending on acute retinitis, on various affections of the optic nerve and of the brain, and on sympathy with the condition of remote organs. Neither can it be confounded with mere senile glaucoma, or with any condition of glaucoma in which the secretion of the hyaloid membrane has merely sustained an alteration in its colour. Alterations in the quantity and colour of the choroid pigment are common to certain forms of amaurosis and of glaucoma, and it is matter of common observation that the retina participates in a greater or lesser degree in every case of inflammatory glaucoma, and in all instances of this affection connected with an increase in the quantity of the vitreous humor. In some cases it is quite impossible to draw an absolute line of distinction between glaucoma and amaurosis—their characters are associated in a manner which leads us to say the amaurotic affection is attended with an increase in the quantity and an alteration in the colour of the vitreous humor. I have mentioned, as a part of the pathology of glaucoma, a diminished secretion of the choroid pigment, and I am satisfied that cases have fallen under my care and observation in which a similar diminution in the quantity of the choroid pigment has existed as the sole defect of the eye, and constituted the adequate and efficient cause of the impaired vision.* Glaucoma seldom occurs in early life, and when it does take place it is rarely much amended by treatment, and its characters partially merge, in the course of its progress, into those of amaurosis.

Of course, amaurosis may exist in conjunction with many other ophthalmic maladies, such as opacity of the cornea, conical cornea, &c. and, as it is desirable to estimate the extent of the more important malady, it is necessary to separate as far as possible the symptoms produced by each defect, so as to award only to the amaurotic affection that share in producing the imperfection of vision which properly belongs to it.

PROGNOSIS.—Recent cases are in the general more favourable than those of long standing, and those in which vision is merely impaired, than others where it is totally destroyed. Where the case is recent, takes place in young persons, and is evidently produced by vascular plethora, our prognosis is favourable, because we are assured from the degree of vision which yet remains that no important structural change has yet occurred, and further, because we can readily remove the cause on which it depends—the plethoric state of the system. If it take place from the free administration of mercury, from protracted suckling, from profuse diarrhœa, or from a state of general debility induced by other causes, our prognosis will be regulated by an acquaintance with our capacity or otherwise to remove the debilitated state of the system, or to arrest the continuance of the cause of that debility, which in some cases is most easily effected, and in other instances cannot be accomplished at all. When vision is totally destroyed, the iris immoveable, and the pupil largely dilated, and when this state of things has continued for a long period, we cannot hope to effect much benefit by the adoption of any plan of treatment; and where the amaurosis is dependent on hydrocephalus, the case is equally hopeless. And such would be the character of the prognosis in reference to amaurosis produced by an *extensive* wound of the retina, or a *severe* blow upon, or *violent* compression of, the eye. Complete amaurosis induced by prolonged exposure of the eye to vivid light, or exposure to causes which have operated more slowly in destroying the sensibility of the retina are seldom under the influence of our remedial means. If the amaurotic affection be complete and originated in acute or chronic inflammation of the retina, which, however, has long subsided, the loss of vision will most probably depend on some structural change in the retina and is not likely to be restored; although, as I before represented, such cases are not quite desperate, inasmuch as the opaque matter deposited by the inflammatory process within the texture of the retina, may become wholly or partially absorbed, leaving that tunic in the same or nearly in the same state as it was prior to the attack. Gutta serena dependent on organic change in the retina and on considerable atonic enlargement of its vessels is, for the most part, absolutely irremediable. Amaurosis arising from impaired stimulus of the retina, as occurs in congenital cataract, in the case of some miners and others who conduct their avocations by means of a very feeble light, is rarely amended by treatment whenever it has been allowed to continue for any great length of time.

---

* Cases of this description are for the most part attended by a contracted pupil and great intolerance of light. On an attentive examination of the eye, a cupped reddish-brown surface may be noticed. Vision though often seriously impaired is rarely entirely destroyed.

Nearly every case of amaurosis dependent on various deranged states of the uterine system is capable of relief, and many of them are entirely cured, and those also which arise from partial division of the supraorbitary nerve, the presence of a carious tooth, or of a foreign body within the orbit, &c., and from a great variety of sources of gastric and intestinal affections, as well as from deranged states of other of the abdominal viscera. On the contrary, those cases which depend on inflammatory depositions at the origin of the optic nerves, change in the texture of those nerves, or material morbid alterations in the parts through and along which they pass, are almost always hopeless. And the same, of course, may be said of those cases which arise from any material change in the texture of the brain, or from abscess or the development of tumours in, or on the occurrence of scirrhous or fungoid degenerations of, that part, or from any prolonged source of compression of the encephalon.

## TREATMENT OF AMAUROSIS.

In commencing the treatment of amaurosis it is desirable to group together the pathological states of the nervous apparatus of the eye as far as we can, so that we may be enabled to conduct the management of gutta serena arising from different causes in nearly the same manner, whenever they lead to the same pathological state of any given part of those textures the absolute integrity of which is essential to the perfection of vision. But, amaurosis is sometimes merely a symptom of other disease, and, of course, under such circumstances our attention ought to be directed to the primary malady. On this account I shall not deem it necessary to enter at all fully upon the treatment of amaurosis proceeding from hydrocephalus or apoplexy, fracture or depression of the bones of the cranium, or from various disordered states of the uterine system, &c.

*Amaurosis produced by general plethora, by determination of blood to the head, or by chronic retinitis.*—If amaurosis depend on general plethora, determination of blood to the head, or on chronic retinitis, the treatment would consist, first, in bleeding; secondly, in the administration of mercury; thirdly, in the use of purgatives and such other medicines as the particular circumstances of the case may require; and lastly, in the employment of counter-irritation.*

*Bleeding.*—It will be proper to remove blood in these cases either by cupping or venesection; and, as relates to the quantity it may be necessary to remove, that will depend altogether on the strength, on the constitutional vigour of the patient, and the state of the symptoms. One or two free bleedings must be had recourse to, so that the plethoric state of the system may be effectually diminished, and the vessels of the retina essentially relieved. I do not much approve of leeches in these cases, because the good they effect is very trifling in degree, and is but a very imperfect substitute for more energetic practice; they may be useful after general depletion which may have been scarcely sufficient completely to effect the object we have in view.

---

* Amaurosis dependent on a congested or inflamed state of the retina appears to have been so very correctly treated by Dr. Mead that I am scarcely aware that we have made any material addition to our therapeutic knowledge upon this subject since his time. "First of all," says the Doctor, "blood is to be drawn both from the arm and the jugular, and to be repeated according to the degree of the disease. Then it will be necessary to give cathartics, especially such as purge gross humours; it will then be very proper to join calomel to other cathartics; or rather to take it by itself, and a few hours afterwards some gentle purgative. And this method often succeeds, when the disease is beginning or recent; but if it be of some standing, it requires a more powerful treatment, that is, a plentiful salivation, raised by mercurials taken inwardly in small quantities, and at short intervals." *Medical Works.* London, 1762, page 536.—The value of his method of treatment may be inferred from the following statement of its success:—"I made the first trial of this course on poor patients in the hospital, when I was a young practitioner, and afterwards on others, who thereby recovered their sight, for which I was complimented by the physicians, who till then had looked on the disease as incurable."

*Mercury.*—I do not know that any medicine approaches to mercury in the extent of its applicability and the efficacy of its action where the amaurotic affection depends on vascular plenitude of the retina, and that peculiar action of its capillary system of vessels which is so prone to originate organic changes—I am not, of course, referring to the permanent atonic and varicose enlargement of the vessels of the retina. Now, in order to accomplish this change—to lessen the vascular plenitude, to alter the action of the capillary system of vessels, and to produce the absorption of effused and deposited matters—it must be given in free and frequently repeated doses so as to act upon the mouth; it will not be sufficient to administer it in alterative doses—to prescribe it in the form of a few grains of blue pill, or Plumber's pill, night and morning—it must be given in the form of calomel and opium every two or three hours until the gums are rendered spongy and vascular. I shall not now enter upon the relation of cases, but numbers occur to my memory where the utility of this practice, and particularly the mercurial part of it, has been most satisfactorily established. If the amaurotic symptoms are not at all relieved, if they do not in the slightest degree decline, when the gums are rendered sore and the system is placed under the decided influence of mercury, it is not necessary to extend its use further, for there is strong evidence in the fact so established, that the disease is not remediable by its employment; but, on the contrary, if they are meliorated though not quite removed, then it would be advisable to maintain its action in a diminished degree by the administration of two grains of the submuriate with a small quantity of opium, once or twice daily.

Until the diseases of the eye were pretty well understood, amaurosis was very generally believed by medical men to depend, in a vast majority of instances, on weakness, the patients themselves entertained the same notion, the imperfection of vision was termed "a weakness of sight," and various local and general measures were employed to strengthen it, such, for instance, as bark and ammonia to invigorate the constitution; and æther, various stimulating vapours to the surface of the eye, and electircity, to excite the nervous and vascular energy of the eye itself. In those cases of amaurosis connected with the pathological conditions to which I have just referred, after bleeding has been practised and mercury carried as far, and continued as long, as may appear to be requisite and justifiable, purgatives of various kinds and perhaps mild tonics may be useful, but, before commencing their use, that action of the capillary vessels of the retina on which change of structure depends, must be arrested and altered.

In none of the forms of amaurosis depending on the pathological conditions to which I am now directing attention, can the slightest advantage result from the use of any collyria or the application of any stimulating vapours to the surface of the eye. Blisters, issues, setons, or moxas, may be respectively applied as the patient or his medical attendant may prefer, for I do not recognize any sufficiently important difference in their mode of operation or rather in the effects of such operation, to render any one of them decidedly preferable to the others, but, counter-irritation in some form or other, and in a situation rather proximate to the seat of the malady is most necessary, and should be carefully persevered in after bleeding has been practised, until the diseased action is arrested and vision in a great measure restored. I do not for my own part deem it judicious to relinquish counter-irritation even at this period, but recommend a seton to be worn in the back of the neck, or an issue to be made in one or both temples for a few weeks after the amaurotic symptoms have subsided. Where the amaurosis has appeared on the sudden healing of ulcers, the disappearance of an eruption from the surface, the suppression of some customary or periodical evacuation, this method of treatment by counter-irritation is the more necessary, and is indeed quite as important as constitutional remedies. I have sometimes derived very great benefit from varying the situation of the seton or issue; thus, if there has been an issue in the temples for several weeks, I allow it to heal, and at the same time place a seton behind each of the ears. In a few cases where incomplete amaurosis has had an evident dependence on severe and obstinate pain in the head which has not been amended by the usual remedies, I have advantageously placed an issue in the scalp, just over the situation of the longitudinal sinus. The means of exciting counter-irritation behind the ears which I generally employ are, *first*, the insertion of a small seton—a seton made by passing a curved needle threaded with a little silk, through the skin covering the mastoid process; and *secondly*, by placing a small curved blister immediately behind the ear; or otherwise, I smear a little of the emplastrum lyttæ upon a few threads of silk, place it behind the ear and fix it there by means of a strip of adhesive plaster. The degree of counter-irritation and the extent of surface affected, may be accurately and conveniently regulated by the number of the threads, and the duration of their application. When I first commenced practice I was in the habit of producing counter-irritation by passing a few threads of silk through the lobe of the ear, and of applying to the thread various stimulating ointments, I also rubbed tartarized antimony and other irritating unguents behind the ear, but I was compelled to discontinue the practice in consequence of the thickened and enlarged condition in which the part was left by the chronic inflammation these measures excited.

*Amaurosis from debility of the system, or atony of the retina.*—The next set of amaurotic cases to the treatment of which I shall direct attention, comprehends that state of the retina which is produced by those causes which give rise to general debility, among which may be particularly mentioned, copious salivation, protracted suckling, extreme, or the prolonged existence of, diarrhœa, profuse hæmorrhage, great bodily fatigue and prostration of strength, however induced, and also the long continued influence of various depressing passions of the mind. Now, each of these causes will in effect, produce an atonic state of the retina not necessarily or usually connected with structural mischief either of the brain, the optic nerve, or the retina. Atony of the retina from local causes acting upon its surface through the medium of the transparent textures and humors of the eye, is, therefore, properly placed among this class of amaurotic affections.

Nothing can be more evident than that the same treatment which was applicable to the former set of cases will be most improper in this.

In the first place, it would be right to remove, if possible, the original cause of blindness, if it still continued in operation; if, for instance, it were induced by protracting suckling, its discontinuance should be recommended, and, if excited by salivation, a surgeon would certainly advise the omission of the further use of mercury. But the important principle of treatment in all these cases would consist in the reinvigoration of the system; and here the question very naturally arises,—how is this to be accomplished? The use of ammonia, quinine, steel, various vegetable bitters, and the mineral acids, are all of them valuable remedies for promoting the accomplishment of this object, and when the debility is extreme I should prefer, at first, the frequent administration of the carbonate of ammonia, and afterwards the sulphate of quinine; where the debility has been induced by protracted suckling, the vinum ferri, or the tinctura ferri muriatis may be given, and, as the case may vary, the one or other of the previously mentioned tonics may be selected; however, I need not enter upon the minutiæ, for I am only anxious to direct attention to the *principles* which would regulate the treatment—to point out the object to be kept prominently in view in the treatment to be adopted; and to exhibit to your attention the pathological states of the retina induced by these various causes (acting upon it either directly or through the medium of the system) requiring medical aid. There are, of course, a great variety of *adjuvantia*, as they are termed, to be combined with the administration of tonic and stimulating medicines, such as the regulation of the diet, of the clothing, of the exercise, and the adaptation of the residence according to the circumstances of individual cases. It was in these cases that the late MR. HEY extolled electricity, and that MR. WARE and THILEN recommended the application of the vapours of ammonia and æther to the surface of the eye; DR. GERARD, the employment of a weak solution of cayenne pepper; and M. LISFRANC has even gone so far as to cauterize the cornea, at least, he recommends that the inferior segment of the cornea be touched with the nitrate of silver in substance until a white cloudiness appears. The treatment of amaurosis by means of galvanism and electricity, without, in some instances, the exercise of much judgment in the selection of cases for its employment, was formerly a very favourite practice; I find it warmly recommended, and this recommendation apparently justified by the recital of cases, in the fifth, ninth, fourteenth, and thirty-third volumes of the *Medical and Physical Journal*, by RICARDS, SIMMONS, CROWFOOT, and SMITH, and the effects of galvanism are stated to be at least equally satisfactory by OSIANDER, WIENHOLD, GRAPIENGESSER, MARTENS, MAGENDIE, and WAIBLINGER. It is stated by BEER, that slight and incomplete amaurosis dependent on general plethora and on gastric or intestinal irritation are frequently much aggravated and sometimes rendered incurable by galvanism and electricity, and unquestionably, it would be bad and unsafe practice to have recourse to either the one or the other when the malady was evidently caused by general plethora.

Very recently a new remedy for amaurosis has been found in strychnia, and is certainly a powerful addition to our means of combating this wretched malady. The use of this valuable remedy should, however, be limited to the class of amaurotic affections now under consideration—to those in which the retina is in a state of atony from some cause acting *directly* upon its texture, or upon its texture through the medium of the general debility of the system; at all events it should not be used whenever there is much vascular fulness either of the system or the retina, or a tendency to inflammation, and its effects should always be most carefully watched. An atonic state of the retina or of some part of the nervous apparatus of the eye productive of amaurosis, when unconnected with a full plethoric habit of body, determination of blood to the head, or any tendency to apoplexy, and unconnected also with any structural change either in the retina or its immediate nervous relations, is very properly treated by means of strychnia in a manner to be presently explained, and particularly if tonics and general stimulants have been successlessly employed. The bowels must be freely opened before we commence the use of strychnia, and aperient medicine must be occasionally administered during its employment.

*Mode of using the strychnia.*—Place a narrow blister above the eye-brow of the affected eye, or above the eye-brow on each side if both organs are affected, and after it has risen properly, snip away the elevated cuticle and completely expose the raw surface, and having absorbed the serum, sprinkle a small quantity of strychnia upon its surface, commencing with the fourth of a grain upon each side, this quantity may be gradually increased, if vision be not improved, until two grains are placed upon the blistered surface every twenty-four hours. After the strychnia has been dusted or sprinkled upon the blistered surface, a small quantity of linen thinly spread with savine cerate should be placed over it with a view of preventing the frequent necessity of repeating the application of the blisters.

I deem it prudent to use the strychnia only once in twenty-four hours, which gives sufficient time for its absorption, and at the same time maintains—constantly maintains—its full effect; and I conceive it to be advantageous to place the blisters above the eye-brow on account of the probable especial effect of the strychnia upon the supra-orbitary nerve in addition to its other more general influence. Of course, if any symptoms occur during its use indicating that it is either injurious, or that it is being used in too large a quantity, it would be desirable either to omit it altogether, or to diminish the quantity, or at all events to suspend its use for a time. Sometimes its application excites great local uneasiness, which is, for the most part, easily remedied by mixing it with a small quantity of flour or adding to it a little of the powdered opium. I do not enter upon the symptoms which indicate that it is being used in too large a quantity because they are precisely the same as those resulting from the administration of extreme doses of the same remedy for the cure of various other maladies. Now, if vision were slightly improved soon after we had begun to apply the strychnia, and if the patient had occasional flashes of light flitting before the eye, there would be the greatest encouragement to persevere; but if after having increased the quantity for the space of a fortnight and pushed the remedy as far as could be done in justice to the patient's safety, vision was in no way influenced, not in the slightest degree improved, it would be useless and improper to persevere in its use any longer.

The use of strychnia appears to be well adapted to the case of miners whose eyes are affected with incomplete amaurosis, and who have been accustomed to follow their employment by means of a very feeble degree of light, and to those cases of impaired sensibility of the retina occasioned by too great delay in curing congenital cataract. The following case, which I related some years ago in the *Midland Medical and Surgical Reporter*, presents an illustration of the condition of circumstances connected with the long deprivation of the natural stimulus of the retina, to the relief of which strychnia, may be employed with a certain chance of success.

CASE I.—"A few weeks ago, I attended Miss Poole, of this town, who had, many years since, been operated upon for cataract by the late MR. SAUNDERS. She was about nine years old at the time of the operation, which was very well performed, if we may judge from the appearance of the eyes, which do not present any traces of inflammatory mischief, and are only to be distinguished from perfectly healthy organs, by the large size of the pupil, a rotatory motion of the eye-ball, and a small remnant of capsule at the side of the pupil: this girl is highly intelligent, and in a moderately good state of health, and, with the exception of the defects just mentioned, her eyes are perfectly natural and healthy in appearance, and yet she has never been able to distinguish the form, colour, or magnitude of surrounding objects, having merely a perception of light, and a capacity to distinguish its degrees when varied from an extremely feeble to a very brilliant light; a power which she possessed, though to a less extent, prior to the performance of an operation. Considering the defect of vision to have arisen in consequence of permitting the retina to remain for so many years unimpressed by its natural stimulus, and that by exciting its sensibility it might still be rendered obedient to the stimulus of light, I employed the strychnia in the following manner:—having placed a blister over each eye-brow, and afterwards cut away the raised cuticle so as to expose an extensive surface, which would be likely to prevent the frequent necessity of re-blistering the part, I sprinkled the strychnine upon the raw surface, commencing with the sixth of a grain upon each, and gradually augmenting the quantity until I was enabled to use a grain upon each side, at which time she had occasionally a much increased perception of light, with frequent scintillations; but, unfortunately, the remedy began to affect the head, producing so much uneasiness and nervous disturbance, that I did not judge it prudent to persevere in its use any longer, much less to increase the quantity to that extent which, in my opinion, was indispensable to secure the restoration of her sight. In the course of the treatment I was pleased to hear this patient complain of a sensation of scintillations, as, on former occasions, that symptom had been frequently followed by the most satisfactory result; and, although in this instance I was unable to persevere as I could have wished, in consequence of the extreme head-ache and other symptoms, yet it is still hoped that, on some future occasions, she may be enabled to bear the requisite treatment without a recurrence of these untoward events.

"There is one other circumstance which was remarked in this case, and which appears to me worthy of recording: when the blistered surface had healed in its circumference I was compelled to place nearly the whole of the strychnia upon a very small space, indeed a great part of it was dusted upon, and immediately around, the situation of the supra-orbitary nerve; and it was observed that the remedy acted with greater advantage than when placed upon a larger extent of surface. It immediately occurred to me, that the nervous connexion subsisting between this branch and the nervous supply of the iris, &c., afforded a satisfactory explanation of the circumstance. Acting upon this impression, I repeated this mode of application upon a patient soon afterwards, and instead of applying a long narrow blister over the whole eye-brow, and partly upon the temple, as on former occasions, I directed the lower border of the blistering plaister to be placed, as nearly as possible in, and just above, the situation of the supra-orbitary notch, desiring that it might not extend beyond the outer edge of the eye-brow; and in this case also the advantage of limiting the application of the remedy was equally evident. As, however, the quantity it may be necessary to use in order to produce the desired effect, will in some patients be considerable, and as we cannot calculate upon the absorption of a thick layer of powder, with the requisite degree of rapidity, it will often be advisable to scatter it more extensively; bearing in mind, of course, that only as much of the strychnia must be placed in the situation we have considered to be that in which it acts most efficiently, as can be absorbed within the time allotted for a second application.

"If, in the case of Miss P., the use of strychnia had been commenced soon after the failure of the operation of solution, there would have been every prospect of the recovery of a much greater degree of vision than she at present enjoys."

CASE II.—EDWARD HILTON, æt. 35, is affected with amaurosis, so that he is but just able to distinguish suddenly and extremely varying degrees of light. He is a pale, and by no means a robust person. He is in a pretty good state of health, and is not subject to any constitutional disease, such as gout or rheumatism. He has been occupied as a smith, and has worked nearly all his life at a bright fire. The eyes are dark coloured, the pupil large and equally so in each eye, the iris is healthy in appearance, the pupil is very sluggish in its movements, but it retains a perfectly clear and black appearance.

This man had been discharged, unrelieved, from the infirmary, before I was aware of the value of strychnia in cases such as his. His eldest child led him, some time afterwards, to my house, and, as he was suffering from no pain in the eye or head, as he was tolerably healthy, except that his system was weak and languid, and as his eyes were healthy in their appearance, I concluded that the loss of vision from which he was suffering arose from that impaired sensibility of the retina which prolonged exposure to an undue degree of its natural stimulus is known to produce; he was, indeed, suffering from that form of amaurosis which BEER has stated to depend on "preternatural depression of the vitality (sensibility) of the optic nerve, (retina,)" and which DUPUYTREN has termed "paralysis of the retina."

Having well cleared the bowels by a dose of purgative medicine, I placed a blister over each eye-brow, and directed him to call upon me every day to have them dressed; and I daily sprinkled upon the raw surface, on each side, the sixth of a grain of strychnia, gradually increasing the quantity to two grains. In the course of a few weeks his sight was very much improved, but he became tired of this troublesome and rather painful treatment, and was again entered, at his own request, on the infirmary books; but the treatment to which we subjected him at this institution, was of no service whatever. However, he could see tolerably well for one or two hours during the day, and could manage to find his way about the streets, without being led by his child as formerly. Wishing to gain a still further degree of vision, he called at my house and expressed his willingness to continue any treatment I might consider necessary. I again employed the strychnia as before, and his sight underwent a marked and progressive amendment; however, he said he could not bear the pain which the application of the strychnia now produced, and he again discontinued his attendance. He afterwards went to the hospital, in this town, and remained there about six weeks, but he derived no benefit from the treatment he underwent at that institution. After he had left the hospital he was subjected to a further trial of the strychnia, but he was not willing to have it applied many days in consequence, as he stated, of the severe local uneasiness its application occasioned. His sight is, however, sufficiently restored to enable him to follow the coarser parts of his business.

CASE III.—GEORGE JONES, *æt.* 47, has suffered from impaired vision for several years; his sight is now so defective that he has been obliged, for some months past, to relinquish his employment. He has been accustomed to work in a coal-pit in the neighbourhood of Dudley all his life. He is a thin pale person, of temperate habits, and in the enjoyment of good health; has been subject to no form of constitutional disease that he is aware of, and has never suffered from any blow, or injury, or inflammation of the eye, that he remembers.

*Appearance of the eyes.*—Both eyes are the same in their appearance, and the defect exists in each of them in an equal degree, so that the description of one organ comprises an account of both. The pupil is enlarged and immoveable, but retains its natural black appearance. The iris retains its proper plane—being neither convex nor concave when viewed anteriorly. The superficial vessels are not enlarged, the eye is not softer or harder than it ought to be. There is no strabismus or ptosis present, or any want of correspondence in the movements of the eyes. I should say that an attentive examination of the eyes, leads to the conclusion that, with the exception of the enlargement and immobility of the pupil, there is really no indication of disease.

*Treatment.*—Having had the bowels well opened by the administration of mercurial purgatives, I commenced the employment of strychnia, by dusting upon a blistered surface over each eye-brow, the sixth of a grain; I continued the use of the strychnia for about a fortnight gradually increasing the quantity until I was enabled to apply a grain and a half in the course of the twenty-four hours. I then recommended him to discontinue treatment, as the medicine produced pain in the head, slight muscular twitchings, &c.

*Result of the case.*—Vision is sufficiently restored to enable him to continue his employment. He can see best in a very bright light. If he follows his work one week more closely than usual he is unable to engage in it during the succeeding week more frequently than every other day. At all events the sight is seriously impaired, if it be more actively and constantly exercised than usual.

I have tried the effect of strychnia when internally administered, and I am urged to the conclusion that, on whatever pathological state the existence of amaurosis may depend, it is never cured—never entirely removed—when its removal is attempted by this means alone. I have, however, had reason to believe that in a few instances the internal administration of strychnia has been advantageously combined with its external application. My opinion upon this point does not, however, correspond with that of a distinguished and experienced French physician, who has assured me, in a recent conversation, during his stay at Birmingham, that he has derived the happiest results from the use of strychnia taken in the form of pill, in cases of amaurosis such as those in which I had obtained great advantage from its outward application.

I shall close my observations on the local application of strychnia by remarking that, although I have been accused of recommending this means of relieving certain forms of amaurosis more strongly than its merits justified, I am perfectly assured that it is fully entitled to hold a very high rank—a much higher rank that it at present holds—among our curative measures; and that my apparent zeal in advocating its claims to the notice of my medical brethren, has been solely dictated by a desire to extend the usefulness of my profession; and, notwithstanding the labour and expense I have cheerfully incurred to gain a pretty full acquaintance with those circumstances calculated to assist in removing every obstacle to its safe and successful employment, I shall be the first to discard its use whenever a better and more efficacious means of accomplishing the same end is discovered. Impressed with these views, I stated in the last (third) volume of *The Transactions of the Provincial Medical and Surgical Association*, that "the experience of every year strengthens my conviction of the value of strychnia in the management of certain defective states of vision; and I would earnestly entreat my professional brethren to form their estimation of its powers, not by any vague condemnation it may have received from those who have either not taken the trouble to test its efficacy, or to select proper cases for its application, or to employ it cautiously and judiciously, but by their own experience, and from their own observation.

" My opinions upon this subject have been derived from years of laborious and extensive observation; and I am satisfied, that if those who have censured the practice will labour in the same way, they will meet with the same result, and will be prepared to recognise, in this excellent remedy, a means of rescuing many of their fellow beings from a state of blindness. But, it will be understood, that, in order that benefit may be obtained, a little judgment and discrimination must be exercised in selecting appropriate cases for its use; and I mention this the more particularly, because I, in common with other members of the Provincial Association, must be aware that many cases which have recently been published in various *Medical Journals*, were quite unsuited to the application of the remedy; and, indeed, some of them were evidently rendered worse by its employment."

*Amaurosis dependent on an enlarged and atonic condition of the vessels of the choroid or of the retina.*—This form of amaurosis is usually attended with an enlarged and immoveable pupil; the humors of the eye are cloudy; sometimes there is a distinct appearance of the enlarged vessels to be noticed, and this is more likely to happen if the amaurotic affection be occasioned by the atonic enlargement of the branches of the arteria centralis retinæ. I have sometimes observed a pale buffy or faint yellow appearance at the bottom of the eye, or the pupil has appeared to be merely dark—a sort of muddy darkness—at all events it has not possessed its clear and densely black appearance. In the former case it would appear as though the case was combined with the deposition of a small quantity of lymphatic matter within or upon the texture of the retina, as a consequence of that condition of things which induced the vascular enlargement; and, in the latter instance, it would seem that the choroid secretion was diminished or had undergone some alteration in its qualities. It very generally happens also that there is a corresponding enlargement of the superficial vessels of the eye, that the iris is convex in front and pushed towards the cornea, that the eye-ball is more tense than it ought to be, and that muscæ volitantes or scintillations are present in an extreme degree. The occasional combinations of various pathological conditions of the retina and neighbouring parts, tending and concurring to produce amaurosis, is very manifest;—in fact, I should say it was very common—it is revealed by the history of the case, by the appearance of the eye, and by the product of post-mortem examination. So that when I speak of amaurosis dependent on certain pathological conditions of the retina, I do not mean to affirm that surrounding parts are in a state of absolute health—in a condition of perfect integrity—but, merely to represent, that the morbid condition of the retina is the more material and ostensible cause of the malady. When the sensibility of the retina is diminished or destroyed by an atonic enlargement of the vessels of the choroid, or of the retina, it is very improbable that any treatment we may adopt will succeed in much improving or restoring vision. However, such casesare not absolutely hopeless, and it would be right to attempt their relief. The measures it would be proper to adopt would consist in the repeated application of blisters to the temples, the insertion of setons in the temple and at the back of the neck, or immediately above the eye-brows; in enjoining abstinence from all active exertion of the organs, as in the inspection of minute and glittering objects; and in avoiding all undue exposure of the retina to the influence of vivid light. Every thing greatly stimulating the retina or much increasing the activity of the circulation in the head and eye must be mischievous, and ought therefore to be avoided; and the same may be said of all constrained positions of the body, all violent exercise and extreme muscular exertion, and every thing which impedes the free return of blood from the head, or which much increases the force and vigour of the circulation there. Some surgeons think it most important that the eyes should be bathed with cold spring water once or twice during the day, but I cannot discover that they have any better reason to give for this practice than a vague and undefined notion of the bracing and astringent quality of cold water when applied to the surface of parts. How can such an application beneficially influence the circulation of the retina? I have tried the effect of electricity in these cases, I have also employed strychnia, but I am satisfied that if the case be one of simple atonic enlargement of the vascular system of the retina and choroid, unconnected with any existing degree of inflammation, the constant presence of some form of active counter-irritation and the maintenance of a pretty free secretion of serum or pus in the neighbourhood of the disease—for instance, in the temple, above the eye-brow, behind the ears, or at the back of the neck—is by far the best mode of management we are at present acquainted with.

*Amaurosis produced by the pressure of a fluid either upon the concave or the convex surface of the retina.*— The cases of this description most commonly met with are caused either by an increase of the vitreous humor, or by the effusion of some fluid either between the choroid and the retina, or between the sclerotica and choroid from inflammation of the latter membrane. This statement, if correct, and I firmly believe it to be so, will at once decide the nearly hopeless character of these cases.

Amaurosis produced by an increase in the quantity of the vitreous humor is properly termed an example of inflammatory glaucoma, or of dropsy of the vitreous humor, and is usually distinguished by the tension of the eye-ball, the cloudiness and immobility of the pupil, the convexity of the iris, and its proximity to the neural surface of the cornea. When a quantity of fluid is collected between the choroid and sclerotica, the latter membrane is generally of a bluish-colour and is irregularly projected. Accumulation of fluid between the choroid and retina, may not cause any alteration in the colour and form of the sclerotica, but it always leads to discolouration of the pupil,* to an appearance as though a portion of the retina or choroid was detached and was floating loosely about in the eye, and to insensibility of the retina at nearly every part of its surface. These forms of amaurosis are so far hopeless that, at least, no reasonable *expectation* of restoring vision can be entertained—relief *may* be obtained, and a perfect cure is *just possible.*

If amaurosis arise from an increase of the vitreous fluid, its evacuation might restore vision for a short season by removing the compression of the retina, and if, at the same time, we could prevent its reaccumulation by the use of mercury or by any other means, the amaurotic affection might be permanently cured, that is, presuming that the structure of the retina had not been attenuated or otherwise injured by the pressure it had sustained from the preternatural accumulation of the vitreous fluid. The sub-sclerotic dropsy is much less likely to produce amaurosis than is the effusion of fluid between the retina and choroid; for, in the former instance, the choroid is still in its natural relations to the retina and the rays of light can make their due impression upon that membrane inasmuch as they are still interrupted by the choroid pigment, (presuming, of course, that no affection of the choroid has caused the removal of its natural secretion) but when the effused fluid is situated between the retina and the choroid, the rays of light do not dwell upon the retina sufficiently long to make a proper impression, but are transmitted through it and through the effused fluid, and in this way the depiction of any correct image is effectually prevented. In estimating, therefore, the effects of some of the terminations of choroiditis upon vision, it is necessary to bear in mind, first, its tendency to interfere with and prevent the secretion of its pigment, or to cause its partial absorption; to induce a varicose enlargement of its vessels; and lastly, in addition to the production of structural changes, to lead to the effusion of fluid either between it and the sclerotica, or between the retina and choroid. Now, it is said, that amaurosis from deficiency of the choroid pigment, (the *cat's eye amaurosis* of BEER) is only met with in the old, debilitated, thin, and emaciated; particularly those who are grey or white headed; but I am satisfied that this statement is not strictly accurate. At the commencement of this amaurosis, the iris retains its mobility, but it afterwards becomes impaired and the pupil is dilated. Deep lowish green, a reddish or variegated opacity is observed. in the bottom of the eye, a concave, pale grey, or yel- The further the disease advances, the paler the bottom of the eye becomes, the paleness extending to the iris, until, at last, a slender vascular plexus—the ordinary ramification of the central artery and vein—may be discerned. With this state of the eye, serious impairment or total abolition of vision is the consequence.

---

* If the fluid beneath the retina be of a yellowish colour and project that membrane so as to be seen through the pupil, it will give rise to an appearance *something like* that produced by incipient fungus hæmatodes.

*Treatment.*—The treatment of these cases, with, of course, the exception of amaurosis, arising simply from a deficiency of the choroid pigment and uvea, consists, first, in the employment of mercury; secondly, in the institution of counter-irritation; and lastly, in the *paracentesis oculi.* It would be desirable to avail ourselves of the sorbefacient influence of mercury, and it is possible that that influence may effect the removal of the morbid effusion. At the same time counter-irritation should be employed either by means of setons or issues to the temples or immediately above the eye-brows; or moxas may be tried—a plan of treatment urgently recommended, and certainly very successfully practised, by Baron LARREY.* Purgatives, tonics, stimulants and iodine may be deemed useful, but they do not form an essential part of the treatment of these cases. If these means fail we may then have recourse to the *paracentesis oculi*, and try the effect of other measures afterwards, but, I am compelled to admit that the chances of success will not be very great.

---

* He relates, among others, the following case of a "jeune tambour anglais," who was affected with amaurosis from a long march in severely cold weather, which was very successfully treated by means of moxa. "Comme la cécité de cet enfant était récente, je conçus l'espoir de le guérir; je le fis transporter dans l'un de nos hôpitaux, autant pour l'éloigner du séjour des maladies, que pour pouvoir le traiter plus commodement. Je lui fis d'abord prendre un bain savonneux; je le mis ensuite à l'usage des amers diaphorétiques, et lui fis appliquer le moxa sur le trajet du nerf facial, à sa sortie du crâne, derrière l'angle de la mâchoire: on lui frotta la tête avec un liniment alcalin camphré, on la lui couvrit d'un bonnet de laine, et on fit sur les yeux des lotions avec du vin chaud camphré.

"A la deuxième application du moxa, l'enfant vit la lumière; à la quatrième, il distinguait déjà les objets et les couleurs; enfin, à la septième application, les fonctions visuelles furent totalement rétablies." *Mémoires de chirurgie militaire, et campagnes;* de D. J. LARREY, Paris, 1812, T. iii. p. 269.

*Amaurosis dependent on various pathological conditions of, and irritation in, the alimentary canal and uterine system.*—The states of the alimentary canal, intended to be included in the preceding arrangement, are those in which a foreign body or some indigestible substance remains in the stomach, or in which that viscus contains a large quantity of bile, or one or more worms—and the same remarks apply in reference to the contents of the bowels; and the conditions of the uterine system are, first, that state of the uterus in which the menstrual secretion is either altogether absent or exceedingly scanty, or, secondly, in which menstruation takes place irregularly or painfully.

Under my own observation, amaurosis occurring in connexion with the preceding circumstances, is usually rapid in its progress, and does not proceed to the complete destruction of vision; which is liable to great variations, being sometimes much better, and then again much worse—the condition of vision is, in fact, very variable. The eye is healthy in appearance, except, perhaps, that the pupil is rather larger, and is not quite so susceptible of light as it ought to be.

When the presence of worms, a foreign body, some undigested substance, or a large quantity of bile in the stomach, occasion amaurosis, the plan so strongly recommended by SCHMUCKER, RICHTER and SCARPA, as being very generally useful in amaurotic affections, is to be commended;—I allude to the use of emetics; but, in advising a trial of emetics in amaurosis, I am desirous to restrict their use pretty much to cases of this description. Whenever there is any determination of blood to the head, whenever there is much general plethora, or any great enlargement of the vessels of the retina, either from inflammation actually present or as a result of previous inflammation, it would be highly improper to administer emetics, under the operation of which the return of blood from the head would be retarded and its vessels distended, and, of course, those of the eye distended also;—the use of emetics, under such circumstances, would be injurious to the eye, and would endanger the occurrence of more important consequences. Amaurosis produced by the presence of various irritating matters in the stomach, is not always complete, and generally comes on very suddenly and rapidly, and, on the removal of the offending agent, is usually cured with equal celerity. But it may happen that the first emetic may not be sufficient; it may be necessary to administer several of them before the offending matter is entirely ejected, and if a surgeon has satisfied his mind as to the true cause of the impairment or loss of vision, he can have no hesitation in repeating the emetic as often as may be required, if the power of vision be not restored. If, instead of the stomach, the intestines be the seat of the mischief, the administration of purgatives or anthelmintics, as the case may happen to be one of intestinal worms or of intestinal irritation from other sources, would be necessary. These are the essential *principles* of treatment,—and they distinctly comprehend the complete removal of the cause of the loss of sight—and I am not aware that any thing more is requisite than the subsequent administration of laxatives and tonics, with a due regulation of the diet.

What is the treatment of amaurosis, proceeding from irritation, excitement, or disorder of the uterine system, including painful and irregular menstruation and chlorosis? Is there any particular treatment necessary directed merely to the state of the retina; any thing having for its object an effect upon the eye quite independently of an influence upon the uterine system? I believe the treatment of the amaurosis so produced, resolves itself into the treatment of the disease from which it proceeds, and upon which I shall not now enter, as it would very needlessly extend my observations; but even in these cases it would be advisable to institute some permanent form of counter-irritation, either in the neighbourhood of the temples or at the back of the neck. When the menstrual secretion is scanty in quantity, and appears irregularly at prolonged intervals, Scarpa extols the advantages of applying leeches to the pudenda; and Richter also gives the same advice, and mentions, in illustration of the utility of this mode of treatment, two very singular and interesting cases.* In one of them, the patient, who had lost her sight from a sudden suppression of the menses, did not recover it again, although various evacuating measures were employed, until three months after they had re-appeared. And, in the other instance, blindness had continued for six months, and was attended by amenorrhœa, but, whenever leeches were applied to the pudenda, the menses appeared and continued for a short time, during which period vision partially returned.

*Amaurosis from mental emotions.*—Among the various passions or emotions of the mind which occasionally produce amaurosis, I may mention, particularly, fear, grief, disappointment and anger. The three first act in nearly the same way, either by producing some particular effect upon the sensorium, or by depressing the nervous energy of the system generally. The latter (anger) operates by exciting vascular action in the brain and in the eye, and in some instances leads to effusion, and to some variety of permanent amaurosis, or otherwise, by disturbing the alimentary canal. I have already treated of that pathological state upon which this latter effect of mental emotion depends. RICHTER alludes to the case of a *priest*, who became suddenly blind after having been violently enraged, but whose vision was perfectly restored, on the following day, by the administration of an emetic.

---

* The same advice is given by L. Winslow, (*Dic. des sciences médicales.* T. i. p. 432) Wenzel, (*Dictionnaire ophthalmologique.* T. i. p. 331). Jourdan, (*Dic. des sciences medicales.* T. xix. p. 290,) and Sanson, (*Medical Gazette.* Vol. xii. p. 63.)

In the case of amaurosis induced by grief, by fear, and by disappointment, we must observe, *first*, the state of the vascular system; *secondly*, the condition of the sensorium; and *lastly*, the state and appearance of the eye. If the function of the brain be unimpaired by effusion or any indication of organic change, if there be no aberration of intellect, and if the vascular system be merely reduced and enfeebled, the pulse being small and languid, we may administer various tonics and stimuli, such as camphor, ammonia, and quinine, and endeavour at the same time to elevate the powers and strengthen the tone of the system, by diverting the patient's attention from the subject of his apprehensions, his disappointment, or his sorrow; and it would be almost criminal to lose sight of the advantages to be derived from change of air, and change of scene, as a means of diminishing, or diverting attention from, afflictive and gloomy impressions. If these means so far succeed as to increase the strength and improve the health, but do not influence the state of vision, it would be right to try the effect of strychnia applied in the manner I have previously explained, and with the precautions I have suggested. With our present means of ascertaining and determining the state, the precise pathological condition, of the retina under the influence of the depressing passions, I am far from wishing to assert that it is always in an atonic state; they may in some cases lead to excitement, they may affect the structure of the retina in a peculiar manner—a manner wholly different from that which usually induces atony; but it is impossible to witness the constitutional condition of persons so suffering, to observe the state of their vision, and to attend to the history of its loss, and, at the same time, to notice the effect of remedies, without arriving at the conclusion that, if they do not induce an atonic state of that membrane, they give rise to a condition so far resembling one of atony (I admit the somewhat indefinite character of the term) that it is altered and amended by local and general stimuli.

*Amaurosis from sudden exposure of the eye to vivid light.*—When the eye is suddenly exposed to vivid light, particularly if it be as suddenly contrasted with total darkness, the power of vision is sometimes instantly destroyed. Does this effect take place by increasing the vascular action of the retina, or from suddenly distending its vessels? It does not appear to arise from either of these causes, for, unless the retina possessed an independent circulation, a circulation distinct, as regards the pulsation of its vessels, from that of the system generally, it could not be sufficiently increased in the rapidity or rather the frequency of its pulsations by any locally operating agent, neither could the plenitude of its vessels be suddenly increased whilst the state of the circulation in the head and neighbouring parts continued as usual. The occurrence of blindness under the circumstances we are now considering is so instantaneous, it follows so immediately the application of its cause, and it is generally so complete, that it is difficult to imagine that it can in any case depend on any change or variation in the state of its circulation. It is much more reasonable to suppose that it is caused by some influence upon the nervous structure of the eye, that its stimulus is of so overwhelmingly vivid a nature that it at once annihilates its susceptibility to the impress of light, just as a sudden explosion or any intensely loud sound produces either temporary or permanent deafness. The loss of the sense in either case appears to be immediately consequent to the operation of the cause of that loss and not to be explained by the occurrence of any change in the state of its circulation, and to be equally inexplicable in other respects, on such grounds.

In almost every case in which I have witnessed the occurrence of sudden and complete blindness from a flash of lightning, the pupil has been enlarged and immoveable, and, for the most part, clear, but I have once or twice observed that the pupil has been cloudy, under circumstances which have led to the conclusion that the turbid state of the humors of the eye has been suddenly caused by the same agent that determined the immediate occurrence of blindness. Amaurosis so produced may be complete or incomplete, it may occur at once or gradually, and finally, even if no remedial measures are employed, it may be permanent or temporary in its duration. Sometimes the sight is only slightly impaired at first, but the morbid agent communicates a tendency to inflammatory or other disease, which eventually leads to the absolute destruction of vision.

Knowing that the blindness has been immediately consequent to the sudden exposure of the eye to vivid light, as, for instance, to a flash of lightning, it would be proper, *first*, to clear out the alimentary canal by the administration of an ample dose of calomel and jalap; *secondly*, to apply repeated blisters just above the eye-brow; and, if the blindness still continue, it would not be improper to try the effect of electricity as recommended by Hey, Ware, and Swan, or even to apply the strychnia as previously advised and explained. I apprehend this is a class of cases for the relief of which Larrey would apply repeated moxas behind the angle of the jaw; and Magendie, the ammoniated ointment over the site of the frontal nerve. Many of these cases will recover in the course of a few days or weeks without the employment of any treatment whatever, but the chances of the return of vision will be much increased by clearing out the alimentary canal by means of active purgatives, and by the employment of blisters to the temple or above the eye-brows; and these means may be tried before having recourse to electricity or the application of the strychnia. In those cases where amaurosis succeeds to an improper exposure of the organ to an undue degree of light, where the application of the injurious agent is slower and more gradual, and the dimness of vision increases by degrees until it is wholly destroyed, the plan of treatment just mentioned would not be applicable, because the loss of vision in the latter cases would, in all probability, depend on certain morbid changes produced by an increase of the vascular action of the part—changes which nothing less than the free and persevering use of mercury so as to excite and maintain sponginess of the gums for some time, will be likely to remove.

*Periodical amaurosis.*—By periodical amaurosis I mean an amaurosis attended with serious impairment or total loss of vision, returning daily, weekly, or monthly, or at irregular intervals, vision, in the intermediate periods, being little or not at all impaired.

Now, this variety of amaurosis does not always depend on the same pathological condition of the system or of the retina, for it may occur in the strong or the delicate, the infirm or the healthy, and it cannot, consequently, be either successfully or scientifically treated in every case by one and the same method of treatment. The experienced SCARPA has, I think, committed a great error in generalizing too much upon this subject; he says "with respect to the imperfect periodical amaurosis, every practitioner would be disposed to believe that the cinchona ought to be the specific; experience, however, has proved the contrary, and convinced as that this excellent remedy, which is so efficacious in intermitting fevers and other periodical diseases, rather aggravates the imperfect periodical amaurosis and renders its attacks more frequent, and of longer duration than before. This disease, on the contrary, is most frequently cured, in a short time, by emetics and resolvents; and, lastly, by corroborants and the cinchona, which before was useless or injurious." The same fondness for prescribing emetics may be traced through every part of the learned Professor's remarks on amaurosis, and in advising their use he sometimes appears to forget, or to neglect, the pathological condition of parts on which the disease depends.

*Treatment.*—If the patient be exceedingly plethoric and complain of great pain in the head, it would be advisable to abstract blood somewhat freely, to employ purgatives, and to have recourse to counter-irritation; in short, to depend for a cure on lowering the system, and on the production of counter-irritation; if, on the contrary, the periodical occurrence of amaurosis depended on any particular state of the uterine system, that, of course, would engage attention; if, on any disturbed condition of the alimentary canal, then the purgative, and, in some instances, the emetic plan of treatment would be perfectly proper; and, lastly, if, from any unascertained cause, without either much plethora or a great degree of debility it would be right to prohibit much use of the eyes, and to change, as far as could be done with propriety, the patient's habits generally;—the qualities of his diet, the periods of taking it, the mode of taking exercise, should all of them undergo some modification, so as to alter the habitudes of the system generally.

*Amaurosis from compression of the brain.*—The sensibility of the system generally may be annihilated by pressure upon the brain, as may be observed in the latter stages of hydrocephalus, in serous or sanguineous apoplexy, and in fracture with depression of some part of the bones of the cranium. Again, the pressure may be partial, it may exist only at that part of the brain from which the optic nerves arise, or along or near to which they pass; or it may exist merely at their origin. A case is mentioned where an accumulation of fluid in the infundibulum occasioned pressure upon the optic nerves and consequent amaurosis; another, in which an aneurism of the cerebral artery of the size of a hazel nut produced a similar effect; and we are assured that a general enlargement of the circulus arteriosus is capable of producing amaurosis. It will be observed that some of these causes of amaurosis are irremediable and that others admit of mitigation or removal, but that in all of them the treatment which may be adopted has a more important object in view than the mere restoration of sight. It can scarcely be necessary to enlarge in this place upon the management of these accidents and diseases which so effect the destruction of vision.

*Amaurosis from various changes in the retina or optic nerve, or from pressure or mechanical irritation of the optic nerve.*—Recent amaurosis consequent on acute or chronic inflammation of the retina, and produced by lymphatic deposition upon or within its texture, is most judiciously treated by the free and persevering administration of mercury, as I have previously mentioned. But, when the retina is either softened in its texture by inflammation or other causes, when it has become ossified or has been injured by puncture or laceration of its substance, the case is quite hopeless, and nothing with which I am acquainted will be of the slightest service in effecting the restoration of vision. The optic nerve may be the seat of atrophy independently of any primary insensibility of the retina. Again, effusion may take place between its fibrillæ or its membranes, or it may be the seat of various morbid growths; and lastly, its texture may become softened, or it may suppurate.

Amaurosis produced by either atrophy or ramollissement of the optic nerve cannot be relieved or cured, for we can neither increase the growth nor promote the nutrition of the optic nerve, nor can we restore its healthy firmness by any measures we may employ. Effusion within its texture, between its fibrillæ or its membranes, or growths in one or other of these situations, are most likely to be checked or removed by the institution of some form of counter-irritation, by the administration of mercury, or, by the employment of iodine; but, even in the few cases in which we are capable of ascertaining the existence of any one of these sources of amaurosis, we shall rarely succeed in relieving or removing them. If the amaurotic affection depend on serous infiltration, or some fluid effusion, or solid inflammatory deposition, the use of mercury so as to produce and maintain a state of slight ptyalism for several weeks, will be most likely to effect its absorption. If the cause of the amaurosis be some morbid growth within the optic nerve or between its membranes (and such growths generally arise from its cellular texture) the persevering employment of iodine would be preferable; and it would not be right to relinquish its use until the patient had taken it for at least two months, unless it previously occasioned a degree of inconvenience or constitutional embarrassment which it would not be desirable to incur considering the very slight chances of benefit which are connected with its administration.

When the optic nerves are exposed to compression in various parts of their course, particularly by some change in the ossific apertures through and near to which they pass, or to irritation from some cragginess or inequality of the bony structures, no benefit beyond the tranquillization of the nervous system and the relief of pain can be expected to result from medical treatment. It may be desirable to try the effect of mercury or iodine, either locally applied or internally administered, if we are pretty sure that the mischief depends on ossific deposition, but otherwise, they would be prescribed without, as I conceive, any clear or definite object.

*Amaurosis from various sources of irritation.*—Amaurosis may arise during the period of dentition; it may take place from the irritation of a carious tooth; from laceration or other injury of the supra-orbitary nerve; and from various other accidents and sources of irritation.

If amaurosis take place during the process of dentition it will be generally attended by other distinctive symptoms, will occur suddenly and be subject to occasional relapses, and will be frequently cured by the free division of the gums, the occasional use of a warm bath, the administration of the syrup of poppies, and some mild laxative, if the bowels indicate a necessity for its use. If amaurosis come on suddenly without, as we may be informed, any evident cause, and if the individual in whom it takes place complain of a tooth-ache or some other trifling ailment, it will be desirable to investigate its nature, and ascertain how far it is likely to have any influence in favouring the loss of sight. The extraction of a carious tooth cannot do much harm, and I have known vision restored in two instances by the dentist, to the great joy of the patient and surprise of the operator; and other cases of a similar nature are recorded.

Various sources of irritation, apparently too trivial to produce so important an effect, will sometimes occasion amaurosis, for instance, the growth of one of the eye-lashes from the *inner border* of the tarsal margin, so as to rub against and irritate the eye, may cause gutta serena, and yet the size, and colour, and situation of the cilia may be such, as to elude every but the most minute and careful examination. A case of this description is mentioned by Mr. Lawrence, and he states that "vision was restored by the extraction of the inverted, delicate, and light-coloured eye-lash." Mr. Ware says, that he cured a case of perfect amaurosis by removing a small encysted tumour from the tarsal border of the lower lid. Richter succeeded in restoring the sight of a patient whose vision had been destroyed by the lodgment of a shot beneath the conjunctiva at the upper part of the eye-ball and between it and the superior palpebra, merely by dividing that membrane and extracting the foreign body. A patient from whose scalp Mr. Howship removed an encisted tumour experienced a marked and permanent improvement in his vision very soon after the operation.*

---

* The following events succeeded the removal of a tumour from the neighbourhood of the eye, under the observation of M. Demours. I quote the circumstances as he has related them. " Depuis un grand nombre d'années, M. de L*** avait dans le cuir chevelu une loupe, ou tumeur enkystée, de la grosseur d'une très-petite noisette, qui le gênait peu; cependaut il desira en étre délivré. Elle était située à trois pouces de 'extrémité externe ou queue du sourcil gauche, directement au-dessus. L'opération fut simple, et exécutée selon les règles de l'art. Dès le soir même, une violente ophtalmie se déclara à l'œil du méme côté, et le lendemain matin le droit était perdu par une amaurose

*Laceration or entire or partial division of the supra or infra-orbitary branches of the fifth pair of nerves.*—Injury of the supra-orbitary branch of the fifth pair of nerves has been long known to be capable of producing amaurosis; it is mentioned by HIPPOCRATES, and is enumerated among the occasional causes of amaurosis by, or otherwise, cases in which such injury or irritation produced gutta serena, are related by MORGAGNI, VALSALVA, PANADA, PINEL, CAMERARIUS, VICQ-D'AZYR, PETIT, CHOPART, PORTAL, SCARPA, BEER, HEY, LARREY, SABATIER, BOYER, RIBES, HENNEN, GUTHRIE, and WARDROP. A case is mentioned by DR. HENDERSON, in the *Edin. Med. and Surg. Journal,* which would appear to prove that injury of the infra-orbitary nerve may restore the sight of an eye which has been long lost from an amaurotic affection. He says, that a man who was affected with perfect gutta serena of the left eye had the sight of that eye restored after receiving, and as he thinks in consequence of receiving, a smart blow in the neighbourhood of the infra-orbitary nerve of the right side of the face.

I have stated that laceration or partial division of the supra-orbitary nerve will sometimes produce amaurosis, and cases are recorded in which, after the healing of a wound in the situation of the optic nerve, blindness has occurred, and where the free division of the nerve, which had been previously merely lacerated, has effected the instant restoration of vision. But, in other instances, the

---

complète. La pupille de cet œil est restée, depuis cinq ans, dans le même état, c'est-a-dire immobile, en conservant son diamètre naturel. J'ai dit plus haut que la cornée de l'œil gauche ayant entièrement perdu sa transparence, et la pupille s'étant beaucoup rétrécie, j'ai été cependant assez heureux pour rétablir la vue de ce dernier œil. Au moment où j'écris (1818) j'ai souvent occasion de m'assurer que M. de L*** voit à-peu-près comme il voyait avant sa cécite, et sa vue gagne encore de mois en mois." *Traité des maladies des yeux,* T. i., p. 374.

pathological condition the imperfection, or loss of vision depends, great information will be derived from such discovery, in regard to treatment, and the chances of success will be proportionately increased, and the establishment of a scientific basis of treatment materially promoted.

## ILLUSTRATIONS OF, AND FURTHER OBSERVATIONS ON, THE PATHOLOGY AND TREATMENT OF SOME OF THE PRECEDING VARIETIES OF AMAUROSIS.*

*Amaurosis from compression of the brain.*—Amaurosis usually occurs at the latter stages of hydrocephalus in children. The state of the eye so produced assumes pretty much the same appearance in every case, that is, when the accumulation of fluid within the cranium is considerable. The eye is healthy in appearance, except that the pupil is much enlarged and absolutely immoveable—there is, as it were, a narrow ring of iris just within the margin of the cornea. Nothing can be clearer and more correctly natural, than the colour of the pupil, so that it is quite evident that the retina has undergone no change which has affected its colour. There is, however, an evident appearance, as though the eye was not steadily fixed upon any particular object—it is, in fact, easy to determine, by the character of the countenance, that the patient cannot see.

CASE IV.—S. B., æt. 4, has been the subject of hydrocephalus for three years; the head is immensely large, and when placed between the observer's eye and a bright light, presents very nearly the same degree of transparency as the scrotum in large hydrocele, when subjected to a similar examination. The face appears to be ludicrously diminutive. Vision and hearing are wholly destroyed: the little patient is quite unconscious of the approach of any object, in the attempts to ascertain if any degree of sight remains, and evinces no knowledge whatever even of the sudden exposure to vivid light. The eyes are perfectly well-formed, the iris at its due distance from the cornea, the cornea and parts beneath retain their natural degree of transparency, and the only appreciable difference between the eyes of this child and those of a healthy infant is, the very large size and immoveable state of the pupil. There is merely a narrow ring of iris apparent, and the pupil does not contract, or dilate, or at all vary, under the influence of any mode of exposing them to light, or to its different degrees of brilliancy. It will be remarked, that in this case, the expanded and immoveable state of the pupil constitute the only difference between the appearance of these eyes and those of a perfectly healthy character.

---

* The following illustrations of some of the preceding varieties of amaurosis are, in a great measure, derived from my own observation and practice, but, in a few instances, I have availed myself of the information and experience of others, when that information included a well-marked case of amaurosis arising from a cause which I had either not witnessed at all in the course of my own practice or noticed only in a much less decided and clearly exhibited form.

Case v.—J. S., æt. 45, has received a blow upon the head, which has fractured the skull and depressed the fractured portion of bone. The conjunctivæ are slightly injected, but, in other respects, the eyes are quite healthy in appearance, except that the pupil is much dilated and quite immoveable. The patient is completely insensible, breathing stertorous, and he presents, in every respect, a good illustration of the most perfect and absolute coma.

These two cases are thus briefly related with a view of contrasting them with the amaurotic state of the eye arising from some other cause, and they include an exact description of the condition of the eye when the system is placed under the full influence of various narcotic and intoxicating substances, (I acknowledge sundry exceptions to this general rule); and also when the brain is compressed, either by depression of some part of its bony structure, by the effusion of blood or serum upon its surface or within its substance; and, lastly, during the existence of hydrocephalus. Such, then, is the state of the pupil under these circumstances, and such, as regards the eye and the faculty of vision, are the symptoms with which its loss is attended; but I am far from desiring to represent this motionless and dilated state of the pupil as being invariably present, for we sometimes observe that the pupil is exceedingly contracted, that in other instances it retains its mobility, that it occasionally preserves its ordinary magnitude, and, finally, that instead of contracting on the admission of light, the reverse takes place—the pupil contracting in the absence, and dilating in the presence of vivid light. I cannot, in this place, enter upon an explanation of these circumstances, but, I may mention, that Sir B. Brodie has contributed some interesting and valuable remarks upon this subject, in his paper "on injuries of the brain,"* and they appear to me to comprehend more real information respecting the state of the pupil, in compression of the brain, than is to be found in any other work.

*Amaurosis from general plethora.*—It is obvious that the emetic plan of treatment cannot be adapted to cases of this description—to amaurosis dependent on general plethora—on the contrary, that their use, under this condition of general vascular plenitude, would involve the hazard of apoplexy, or the occurrence of other serious injury. It may be asked, how is vision impaired under a condition of general plethora? Is it from pressure, produced by the congestive and enlarged state of the vessels, upon the brain, operating pretty equally upon every part of its substance? If such were the case, other functions would become impaired, the loss of other senses would occur. In examining such individuals, it will be observed that the face is generally red, turgid, and veined, and the eye is more or less injected, and this would lead to the suspicion that the internal circulation of that organ was in a similar state, that is, that its vessels were enlarged; and it is only on this view of the subject that we can reconcile all the phenomena of amaurosis connected with a plethoric state of the system. In such cases the patient will be troubled with scintillations or vivid flashes of light, or with muscæ volitantes, and there will be occasionally an increased sensibility of the retina, *(photopsia)* almost amounting to *photophobia*, and especially at its earlier stages. It will be remarked that I am referring the amaurosis in these cases to a particular pathological condition of the retina, and not to any incapacity on the part of the brain to attend to the impressions it usually receives from the optic nerve for the purposes of vision, if duly made. But, it may be said, if such were the correct explanation, both organs should be equally and simultaneously affected, which does not, by any means, very frequently happen. When one eye becomes first affected with amaurosis, and the other at a subsequent period, there is, doubtless, some irregularity in reference to the vascular plenitude of parts, the precise nature or cause of which it is not very easy to determine; the dependence of the amaurotic affection on this full state of the system is, however, pretty satisfactorily proved, by the restoration of sight on the adoption of depleting measures, and the lapse of the sound organ into a state of blindness, unless the plenitude of the vascular system be reduced. It will be understood then, that the immediate cause of the amaurosis—the pathological condition of the retina on which the amaurotic affection depends—is an enlarged state of its vessels, by which its nervous structure is eventually much compressed. I do not think that mere increased activity of the retinal circulation, or increased vitalization of the retina by an augmented supply of arterial blood, are sufficiently satisfactory causes of this form of amaurosis, independently of the compressive agency of enlarged vessels upon the nervous structure of the retina.

---

* *Medico-chirurgical transactions*, Vol. xiv.

If the vessels of the brain are enlarged, whether locally or generally, and from whatever cause the enlargement may occur, amaurosis will be likely to take place, and, of course, this liability will be greater whenever the vascular plenitude exists in the neighbourhood of the optic nerves. MR. WARE suggested, as a cause of amaurosis, the dilatation of the circulus arteriosus. He gives an elaborate description of the arterious circle, refers to its liability to become the seat of disease, and proceeds to state, that if "the dilatation take place in the posterior part of the circulus arteriosus so as to compress the nervi motores oculorum, the consequence will be that the eye-lids and probably the eyes also will lose the power of motion, but if the dilatation happens in the anterior portion of the circulus, as the compression will then be on the optic nerves, the sight must of course be destroyed. And should the dilatation take place in both portions so as to occasion a compression both on the optic nerves and the nervi motores oculorum at the same time, while the eye-lids will hereby be rendered immoveable, the eyes also will be deprived of sight and motion altogether."*

The following case appears to confirm the views of MR. WARE, and although the amaurotic affection was associated with other mischief in addition to the diseased and enlarged condition of the arteries surrounding the sella turcica, it is difficult to determine that this enlargement was not the real cause of the malady.

---

* *Observations on the cataract and gutta serena.* London, 1812, p. 400.

Case vi.—"Mrs. ——, aged eighty-three, had been completely blind from amaurosis for thirty years before her decease in 1817. She had also been subject to irregular gout, which assumed a variety of forms, and some months before her death she was attacked with palsy of one side.

"On opening the head, aqueous effusion was found below the tunica arachnoidea, and in both ventricles. One part of the cerebrum was observed to be of a pulpy texture, but these appearances were most probably connected with the recent paralytic attack and not at all with the amaurotic.

"All the nerves, with the exception of the optic, had the usual appearance. On examining the membranous sheaths of these nerves, it was ascertained that their medullary matter had been completely removed, and this change had taken place even nearer to the brain than where the nerves cross each other.

"The arteries of the brain were in most parts altered in their structure; their coats were speckled with white spots, and their texture was more rigid and firm than natural. Both the carotids, where these vessels are in contact with the optic nerves at the foramen opticum, were found to be remarkably dilated, suggesting the idea that the absorption of these nerves was connected with the enlarged state of the arteries. The absorption however of the optic nerves nearer the brain could not be accounted for on this notion; so that it is not easy to conjecture whether the enlarged state of the vessels was the cause or the effect of the absorption of the optic nerve.

"A similar tendency to enlargement of the arteries was noticed where the cerebral arteries enter the cranium, and perhaps it might have been traced in other situations if a more minute search had been made.

"It is perhaps worth remarking, that in both of those situations where the arteries were found dilated, these vessels make a sudden turn, and from this cause their coats are exposed to the full stream of blood from the heart. We can readily conceive therefore that amaurosis may occasionally depend on the enlargement of this turn of the carotid artery, producing by its pressure absorption of the medullary matter of the optic nerves."*

*Amaurosis from enlargement of the pituitary gland.* —CASE VII.—"JOHN AUSTIN, baker, a strong muscular man of temperate habits, aged thirty-eight, for three years past has been afflicted with dimness of vision, accompanied, at intervals, with severe pains in the anterior part of the head, and with a sense of burning and fulness in the orbits, which was at times so distressing as to cause him to apply for advice. He had leeches, blisters, and such medicines as were deemed most proper, without receiving benefit; on the contrary, the application of leeches appeared to increase rather than diminish his sufferings. Notwithstanding this, his strength and general health continued very good, being up during the greater part of the night, and frequently carrying very heavy loads during the day. The digestive organs had been, for the most part, regular in their functions, excepting at slight intervals, and then only from such causes as might be considered wholly independent of any existing local affection.

---

* MONTEATH's translation of WELLER's *Manual of the diseases of the Human Eye*, Vol. ii. p. 79.

" Sunday, May 25, 1823, he again applied for advice; and complained that, during the last five or six weeks, the dimness of vision had considerably increased; that the pains had been much more severe; that he had felt a strong inclination to sleep, so much so that if, during the day, he sat down for a few minutes to refresh himself, he fell asleep, being unable to prevent it, and would continue so until disturbed; and that for the last two or three days he had been completely blind with the right eye, and this morning found himself, for the first time, totally blind with both: for the last week or ten days he had been able to distinguish objects, but upon going to bed last evening, the only object he could discern was the candle, and that not distinctly. On examining the eyes, no very apparent disease manifested itself; the pupils did not contract on the application of a strong light; they appeared rather small, but perfectly clear; he complained of some loss of appetite which had existed for a few days only; pulse 96, and small; natural secretions as usual. Supposing that some of the more prominent symptoms depended on disordered state of the stomach, he was ordered an emetic, and after its operation, five grains of colomel, to be succeeded on the following morning by an opening draught.

" Monday, on being seen at two o'clock, it was found that the medicines had operated very well, having produced several bilious motions; headach not so considerable, and in a small degree had recovered his sight in the left eye; he could see the window, and on placing the hand before his eye, could distinguish something, although unable to tell what it was. The whole of the above medicines were again ordered to be repeated.

" Tuesday, he complained of being much weaker, and, in consequence, kept his bed, which he had not previously done; headach better; vision as yesterday; slept constantly, and snored very loudly. Six leeches were ordered to the temples, the calomel and opening medicine to be continued, and a blister to be applied to the nape of the neck.

" Wednesday, an eminent oculist being called in, he considered the illness to arise from congestion in the cerebral vessels, and ordered twenty ounces of blood to be taken from the arm, with a saline draught every four hours; and concluding that it was a medical case, he declined his further attendance; the patient fainted when he was bled.

" Thursday, he was more inclined to sleep; was roused with much difficulty, but when awake, spoke very sensibly, and answered the various questions proposed to him; since the bleeding the pulse was weaker, and 120; debility greater. This morning, a physician being called in, he was ordered to lose twenty-four ounces of blood from the arm, the saline medicine to be continued, four grains of calomel to be taken at bed-time, and an opening draught on the following morning.

" Friday, at half-past twelve, he died; and on the following day, when he was examined, the following appearances presented themselves:—The membranes of the brain were quite healthy; some degree of fulness of the vessels existed, but it was only very trifling; the fluid in the ventricles was about the natural quantity; on raising the anterior lobes of the brain, a tumour was found arising from the situation of the pituitary gland, and pressing upon the optic nerves; it was of considerable size, forming a nidus in the anterior lobes; the optic nerves were very beautifully expanded upon it; the right diverging nerve was rather more expanded than the left; the olfactory nerves were likewise very much pressed upon."*

---

* *The London Medical Repository*, Vol. 20, p. 217.

*Amaurosis from pressure upon the optic nerves.*[*]—CASE VIII.—" Le nommé **BARDON**, ex-employé, garçon, âgé de trente-six ans, demeurant à Orléans, Loiret, entré à l'hôpital le 8 septembre 1827, mort le 21 novembre.

" A l'époque de l'entrée, pupilles très-dilatées, la droite encore légèrement mobile, la gauche nullement. L'œil gauche est en effet complétement perdu ; le droit distingue à peine les objets, même assez gros, sans appréciation précise des circonstances de grandeur, de forme ou de couleur.

" Il y a *un an et demi* que le malade, habituellement employé à écrire, a été obligé de quitter ses occupations. Maux de tête violens de puis *huit ans.*

" Face pâle, constitution lymphatique.—Saignée. Séton a la nuque.—Peu d'amélioration.

" On promène ensuite des vésicatoires volans sur le front et sur les tempes.—Amélioration sensible et qui va toujours croissant, à tel point, qu'au bout de trois semaines, le malade, du pont de l'Hôtel-Dieu, voyait distinctement les passans circuler sur le *Petit-Pont.*

" Continuation des mêmes moyens, avec moins de'activité cependant, et *même état du malade jusqu'au* 13 *novembre.* Ce jour là il se plaignit de céphalalgie, et en outre de douleurs vives dans les yeux et les oreilles, douleurs qui semblaient *se correspondre vers le milieu de la tête.*

" Le 15 seulement, la céphalalgie et les douleurs persistant, on appliqua quinze sangsues derrière les oreilles. La céphalalgie se dissipa, les douleurs persistèrent, sans qu'on pût d'ailleurs imaginer aucun moyen pour les calmer.

---

[*] This cause of amaurosis is thus referred to by SAUVAGES:—" Ipse vidi bis in puerulis scrofulosis amaurosim etiam subito ingruentem; seto cadavere inveni glandulam strumosam nervis opticis incumbentem." *Nosologia Methodica*, Tom. i. p. 746.

"Le 21, à l'heure de la visite, deux ou trois minutes après m'avoir parlé, il mourut subitement sans proférer un seul cri, et restant dans la position où je venais de le voir.

*Autopsie.*—" Dans l'intervalle de l'entrecroisement des nerfs optiques et du pont de varole, entre les vaisseaux qui forment le cercle artériel, kyste du volume d'un petit œuf de poule, à parois en partie fibreuses, en partie osseuses, principalement en avant et en haut, au point qui correspond à l'entrecroisement des nerfs optiques. Ce kyste est rempli d'une matière jaunâtre, mêlée de sang, dont un tiers à-peu-près est solide et resemble un peu à du tubercule, tandis que le reste est liquide, gras, oléagineux.

" Sur les côtés et en haut, ce kyste correspond aux nerfs optiques, qu'il a aplatis et presque détruits. Ce qui reste de ces nerfs adhère en dedans au kyste par des débris de substance cérébrale altérée, et en avant vient se perdre en un point blanc sur la partie osseuse qui correspond à la commissure. Plus loin on retrouve les nerfs optiques atrophiés, se rendant à l'orbite ; mais, entre cette partie antérieure et la postérieure, il n'y a d'autre continuité que celle établie par la paroi osseuse du kyste.—Dans l'œil on trouve la rétine mince, rougeâtre et presque transparente. Pas d'autres altérations remarquables dans le reste du cerveau.

" Point de trace de la glande pituitaire, dont le kyste occupe tout-à-fait la place."*

*Amaurosis from atrophy of the optic nerve.*—CASE IX. —" A middle aged man, of meagre habit, and very deeply scarred with small-pox, was admitted in the summer of 1829 into the surgical department of the infirmary, on account of chancres and bubo. The chancres soon healed ; but the sore left in the groin after the suppuration

---

* *Journal de physiologie experimentale et pathologique.* Paris, 1828, T. viii. p. 28.

and opening of the bubo was untractable. While in this state, he was attacked with dysentery, which at that time (Autumn 1829) prevailed in the hospital, and was so fatal that about a fourth of those who were taken ill perished. Being transferred to the medical department on account of the dysenteric attack, he became my patient. At this time he had dysentery in its worst form; and although the acute stage was soon subdued, the symptoms nevertheless shewed that extensive ulceration had taken place in the intestines; and he died six weeks after I saw him. At first no attention was paid to the circumstance of his being blind of an eye, as the marks of severe confluent small-pox seemed to account for it sufficiently. But on his mentioning to me incidentally, that the sight was lost only two years before, careful enquiry was made; and it was then learnt, that, on the occasion alluded to, he had been a patient in St. Bartholomews hospital, London, with severe headache, giddiness, feverishness, and incomplete palsy of one of his sides; and that he gradually got the better of these symptoms, but was at the same time attacked with inflammation of the left eye, which burst, and became totally blind. It was natural in these circumstances to expect that some injury would be found in the course of the fifth nerve. This nerve, however, was found quite healthy, so far as the sight and touch could determine. But the optic nerve of the affected side between its exit through the orbit and its decussation with the opposite nerve, was not more than half the breadth of the other and was gray in colour, and flaccid in texture. Between the point of decussation and the thalamus of the opposite side it was of the natural whiteness, softer and less than its fellow; and the thalamus itself was somewhat flattened. The brain was otherwise healthy, except that a very great watery effusion had taken place under the arachnoid coat over the whole external surface, which appeared to account for the severe headache and frequent incoherence remarked towards the end of his illness. There was no appearance of an old cyst or other disorder in the substance of the brain. The colon was covered to an enormous extent with ulcers in various stages of progress. The left eye was completely disorganized."*

*Amaurosis from suppuration of the optic nerve.*—"There is, in the fiftieth volume of the *Journal General de Médecine*, a case of suppuration of the optic nerve. The nerve appeared sound externally; but internally it was filled with a puriform matter, of a dirty-white colour, from the commissure to the globe of the eye. The subject of the case was a man aged forty, who died at the Hôtel-Dieu of an adynamic fever. For the last six months of his life he had lost the use of the left eye; the blindness had come on slowly. He had also been long subject to violent headaches. The eye appeared to be sound, and the iris was perfectly moveable."†

*Amaurosis from atony of the retina.*—An atonic state of the retina may be induced in various ways, and it is presumed to exist independently of any structural change either of the retina or of those surrounding parts which are directly connected with the function of vision; it constitutes the genuine uncomplicated amaurosis of BEER, "the characteristic symptoms of which consists peculiarly and entirely in an impairment or loss of vision without any morbid change in the organic matter of the eye." It is, in fact, a state of the retina which, without presenting any appreciable change in its texture, is attended by a great insusceptibility of that membrane to the stimulating influence of light. It is pretty generally induced by over-working the eye, or by depriving it for a long period of the stimulus of light, which appears to be, to a certain extent, essential to the maintenance of the full vigour of its visual function; this is well illustrated by the condition of the eye in those cases of congenital cataract where the obstacle to vision is permitted to remain for many years uncured by an operation.

---

* *Medical Gazette* for October 11, 1834.

† *A treatise on pathological anatomy;* by G. ANDRAL. Translated from the French by R. TOWNSEND and W. WEST. Dublin, 1831, Vol. ii. p. 800.

Of course, this is one of those forms of amaurosis which is more likely than any other to be benefitted by local treatment, and particularly by electricity and the application of strychnia, or, according to the opinion of the late MR. WARE, (in which, however, I by no means coincide) by the application of various stimulating vapours to the surface of the eye.

At the early stages of amaurosis associated with an atonic condition of the retina, the pupil is somewhat dilated and is only slightly influenced by varying degrees of light. There is not usually present an injected state of the conjunctiva or any appearance of increased vascularity of the eye; on the contrary, that membrane is pale and somewhat exsanguine, and the humors of the eye retain their healthy clearness. By degrees the pupil becomes larger, but I have never observed that it has been so very ample as in many other forms of amaurosis, and I have never noticed that its mobility has been absolutely lost—a slight amount of mobility has been retained, just sufficient to enable us to say that it is not absolutely lost.

CASE X.— — PORTER, æt. 58, has been long in the habit of examining a great variety of old coins, which, as a part of his antiquarian vocation, he would brush and rub until he either discovered, or fancied he discovered, marks of revered antiquity in every piece of tarnished and curious looking metal he met with. By continuance in the practice of prying over these trifling objects of his attachment, his sight became much impaired, and he was compelled to wear glasses, the power of which he subsequently preferred to increase rather than diminish the labour of his eyes. Ardently addicted to his harmless pursuits (as respects others), he continued to pore over the obscure characters, actual or imaginary, of his ancient coins and medals, until he could scarcely see ordinary objects at all, although even then he professed himself able to perceive marks or letters, when their presence was necessary to complete the value of any of his metallic idols, which were invisible to those whose vision, as compared with his, was perfect. When I first saw him his eyes were somewhat vascular externally, the pupil was clear and rather dilated and sluggish in its action, the iris a little too near the cornea, and the eye-ball somewhat tenser than it ought to be. Of course, I directed him to abstain from using the eyes as much as possible, and I also prescribed the sulphate of quinine, and recommended the use of electricity. He thought his sight slightly improved by these measures. I then advised him to blister the forehead and dusted upon the blistered surface daily a small quantity of the strychnia, gradually increasing it in conformity with the directions already given for the use of this remedy. His sight was materially improved by these means but was never perfectly restored, so that he could not follow his antiquarian pursuits as formerly.

In conducting the management of this case it was with the greatest difficulty I could preserve my own eyes from injury, for he was continually beseeching me to describe the characters of his scraps of metals in spite of my declaration of engagements whenever he wished to use, or, I may say, abuse my eye-sight in the absence of his own.

In many persons chronic inflammation would have taken place instead of atony of the retina, and, in some instances, I am quite at a loss to account for the occurrence of one of these diseases instead of the other; however, the success attending the plan of treatment, in the present instance, clearly evinced that my view of Mr. Porter's case was correct; for, of course, the stimulus of strychnia would have had an injurious rather than a beneficial influence upon inflammation of the retina. I think chronic retinitis is more likely to occur where the eyes are much occupied by a bright light, and atony, where the same excessive labour is imposed, but without any much increased degree of light.

*Amaurosis from compression of the retina.*—I have already explained that the retina may be compressed in many and very various ways, and I shall very briefly mention some of the modes in which that compression may take place. 1, The retina may be compressed by enlargement of its vessels, which, of course, may take place under very different circumstances;—2, by deposition of lymph within its texture, or upon its surface;—3, by an increase of the vitreous humor;—4, by enlargement of the vessels of the choroid;—5, by sub-choroid or sub-sclerotic dropsy;—6, by effusion of blood upon its surface; and 7, by the pressure of a foreign body, such as a shot or a displaced lens. Some of these states do not admit of relief, and others are very readily removed.

Case xi.—A gentleman complained of great pain in the globe, with a sense of tension and great dimness of vision, occurring, as he stated, without any cause with which he was acquainted. On examining the eye the iris was found to be somewhat convex, the pupil slightly dilated and sluggish in its motions, and it had also a very dull and cloudy appearance; the globe of the eye was exceedingly firm and hard. Acute inflammation of the hyaloid membrane was suspected, and therefore, bleeding, the use of mercury, and the application of blisters to the nape of the neck were forthwith suggested and employed, but, without any apparently beneficial effect; for the eye-ball increased in firmness and became evidently enlarged, the pupil became contracted and immoveable, the iris was almost in contact with the cornea, the lens was becoming opaque and vision was nearly destroyed. The pain in the eye, the orbit, and the head, were almost insupportable. The eye was now tapped with a fine grooved needle, leeches were applied to the temples, and mercurial ointment, blended with opium, was rubbed over and around the situation of the supra-orbitary nerve. After repeated tapping of the eye, the disease terminated in collapse of the eye-ball, and it is extremely probable, from the state of the patient's vision, that the retina was first compressed, and eventually absorbed, together with the hyaloid membrane and its septa. At all events, where great dimness of vision occurs in connexion with an increase of the vitreous fluid, and independently of any proper and sufficient indication of inflammation, either of the choroid or of the retina, there is satisfactory evidence that such dimness of vision arises chiefly from compression of the retina; and if it continue, on the removal of the compressing cause, there is very good reason to believe that the compression it has already sustained, has either induced an irremediable state of atony, or has caused its partial or total absorption.

CASE XII.—I have lately seen, with my friend MR. BARTLEET, an instance of *occasional amaurosis* from the pressure of a displaced lens upon the retina. The disease was caused by a blow which appears to have displaced the lens and its capsule, which, however, are scarcely at all cloudy. The septa of the hyaloid membrane are absorbed, and the iris vacillates; the pupil is sometimes perfectly clear, and in other instances, cloudy. When the pupil is cloudy, the man can see to find his way about the streets, but, when the pupil is of a clear black appearance, then he is quite blind. He can produce this cloudy appearance of the pupil at pleasure by holding the head a little downwards, so that he walks with his head a good deal bent forward, and looks silly enough to be sure, but it is the only mode in which he can carry himself so as to find his way about the town. In fact, the lens sometimes sinks down upon the retina, its posterior convex surface then resting upon that membrane, but when he bends forward, the lens, (probably in consequence of some slight remaining attachment) rises into its proper place.

The effects of retinitis, which lead to compression of the retina, namely, lymphatic deposition and enlargement of its vessels, and also, permanent dilatation of the choroid vessels, remain to be discussed; and where the amaurotic affection depends on compression of the retina from hydrophthalmia, from sub-choroid, or sub-sclerotic dropsy, the case is always most unfavourable, and must be managed by tapping the globe as frequently as may be required, by the use of counter-irritation, the occasional application of leeches, and the administration of mercury. The case is more favourable when the defective state of vision arises from the effusion of blood, for that is very likely indeed to become absorbed by the prompt adoption of proper remedies, such as bleeding and the administration of mercury. The degree of tension, to which this latter effect may give rise, will be either *primary* or *secondary*, and will be mainly influenced by the measure of violence and the nature of the cause which produced it, and on the severity of the inflammation it may originate. The sudden effusion of blood within the vitreous humor, (for it rarely happens that blood is effused, from accidental injury, upon the surface of the retina, though it may be deposited in that situation from disease) may induce a degree of compression, corresponding to the quantity of blood effused, and may be gradually absorbed without leading to any permanent injury, either of the retina or of any other part; but it is possible that the irritation produced by the effused blood, or by the injury which caused its effusion, may excite inflammation of the septa of the hyaloid membrane or of some other part, and, by augmenting their secretion, a degree of plenitude of the eye-ball may be produced adequate to excite that amount of compression of the retina which may lead to amaurosis, quite independently of any lack of transparency in the parts anterior to the retina. But it will be remembered that increased plenitude of the eye-ball is invariably associated with an apparent cloudiness of the humors of the eye, so that even if the aqueous, crystalline, and vitreous humors are, separately viewed, quite transparent, yet, when these humors exist in a quantity adequate to produce great tension of the ocular tunics, a degree of cloudiness is invariably observed on a careful examination of the pupil of the eye. I am anxious to refer to the distinction subsisting between a cloudy pupil induced by the secretion of turbid humors, without an augmentation of the contents of the globe, and that occasioned by a mere increased plenitude of the eye-ball.

Mr. Ware appears to have had repeated opportunities of observing the occurrence of amaurosis, owing to an increase of the vitreous humor from morbid secretions within its cavity, or between it and the choroid, or between the latter membrane and the sclerotica. In the last edition of his *Observations on the cataract and gutta serena,*[*] he remarks "in the two preceding cases, as well as in several others of a similar description, the operation above described (that of puncturing the sclerotica and evacuating certain fluid matters) afforded manifest advantage, by taking away expeditiously a violent and almost an agonizing pain. Before I conclude, I beg leave to say that I have lately performed a similar operation in two instances of a recent loss of sight, accompanied with a dilated pupil, where there was not any pain or inflammation in the eye; and I have had the satisfaction to see the patients recover their sight almost immediately afterwards.

---

[*] London, 1812, p. 448.

"One of these was the housekeeper to a family in Fenchurch-street, fifty-seven years of age, who had lost the sight of the left eye three days previously to my seeing her, without any known cause to produce it; the pupil being much dilated, and her health in other respects being good. The operation gave her no pain, and the discharge which issued through the groove of the instrument appeared very little, if at all, different from the vitreous humour in an undiseased state. No change was made in her blindness at the time the operation was performed; but, two days afterwards the pupil was less dilated, and the sight so much improved that she was able to read large letters. I saw the patient again two months afterwards, at which time the pupil had returned very nearly to its natural size, and she was able to distinguish both near and distant objects as well as persons usually see them at her age.

"The other case was that of a lad, ten years old, who was suddenly deprived of the sight of the right eye by a blow with a stone, which struck him on the outside of the eyelids but made no wound. Leeches had been applied on the temple, a cooling lotion to the eye, and purgative medicines administered before I saw him. But at that time the blindness continued; the eye was slightly inflamed; and the pupil much dilated. I immediately made a puncture through the sclerotica, and discharged apparently nothing more than a portion of the vitreous humour. The operation occasioned more pain than in the last instance, but much less than in those which were before described. It did not wholly cease for several hours; but he slept without any help from medicine during the whole of the next night, and the following day was much easier than he had been from the time of the accident. On the third day there was not any inflammation, and he distinguished my fingers and several other objects that were held before him. At the end of a week his sight was further improved; but, the pupil continuing dilated, a puncture was again made through the sclerotica, and another portion of the vitreous humour discharged; the pain produced by the second operation being much less considerable than on the former occasion. Two days afterwards he was able to read large letters; but still the pupil was more dilated than that of the other eye. The sight was in the same state at the end of a fortnight; at which time, as his usual residence was in the country, he took leave of me, and I have not since heard from him."

*Amaurosis from concussion of the retina.*—Concussion of the retina may be induced either by a blow upon the eye or head, or by a general concussion of the body; and these forms of injury may lead to many changes in the retina, to some of which I shall especially refer:—they may lacerate or induce inflammation of the texture of the retina; they may change its relations generally to surrounding parts, or merely derange its functional developments. It is to this latter effect of concussion of the retina that the latter remarks are intended to apply.

CASE XIII.—A gentleman received a fall upon his head which was followed by a short period of insensibility.

On his recovery from the stunning effects of the blow, he discovered that the sight of the left eye was nearly lost. A careful examination of the organ detected scarcely any departure from its healthy appearance; the pupil was sluggish in its motions and rather enlarged, but it was neither immoveable nor excessively dilated. When closely examined it was seen to be slightly cloudy, but no indication of an increase in the fluid contents of the globe, or of any solid deposition, was visible. By the employment of bleeding, and the use of counter-irritation and purgatives, his sight was perfectly restored in the course of a week.

I have presumed that in this case the *pathological* state of the retina upon which the amaurosis immediately depended, was some functional derangement—or, perhaps, to be more correctly precise, some inappreciable change of structure the existence of which was evinced by functional derangement—because the amaurosis was so sudden and so complete, the concussion so violent, the restoration of vision so rapid and perfect, and also because there existed no evidence of solid deposition either upon the retina or within the vitreous humor.

I can imagine that where the concussion of the retina had loosened or destroyed its cellular and other connexions with the choroid, torn its substance, or caused the effusion of blood upon its surface, that the restoration of vision would not be likely to occur at all, and, if it did, would take place only very slowly and incompletely—unless, perhaps, in the case of sanguineous effusion. And, of course, if the injury caused inflammation of the retina, such inflammation would be evinced by the usual symptoms connected with retinitis.

Case xiv.—"A young female was, at the beginning of November last, brought to the hospital, on account of a complete amaurosis, after a blow on the right eye with a whip. No wound could be discovered; the conjunctiva was slightly ecchymosed, the pupil dilated and insensible, and vision completely destroyed. The humors of the eye were perfectly transparent. She was bled, and had leeches applied to the temples, but without any immediate benefit. On the third day, however, she began to distinguish light, and, after a few days more, vision was almost completely restored.

"Cases of amaurosis M. DUPUYTREN observed, after contusions of the eye, are by no means unfrequent; but it is worthy of remark, that this effect should sometimes be met with in cases where the external violence appears hardly sufficient to produce such an effect. Thus, corks of champaign bottles, striking against the eye, have, in some instances, produced amaurosis."*

*Amaurosis from retinitis.*—I have already stated that inflammation of the retina may induce amaurosis in various ways;—first, by the mere enlargement of its vessels; secondly, by giving rise to inflammatory depositions; thirdly, by producing ramollissement or atrophy of its nervous texture; and lastly, by exciting an extension of inflammatory action, with its consequences. I shall relate a few cases in illustration of some of these facts.

CASE XV.—HENRY JONES, æt. 19, has been accustomed to write and read very closely by an imperfectly diffused gas-light, for many months past; the light by which he sits at his evening avocation is extremely partial in its diffusion, vivid, and flickering, and the heat it emits is very considerable. He says that, at first he experienced merely an uneasy aching sensation in the eye-ball, and was occasionally troubled with scintillations; his vision was obscured after long attention to the objects of his application, and he was often compelled to shade his eyes on account of the uneasy and unpleasant feeling the more direct and vivid rays of light occasioned. By continuing these habits and this employment, his vision became much confused and obscured, the corruscations of light were much more frequent and annoying, and he was compelled to wear a green shade whenever he walked out during the middle of the day, or whenever he attempted to read or write by artificial light. At this period he was persuaded to wear glasses to strengthen and improve his sight, and the symptoms of which he formerly complained were much aggravated by the adoption of this mischievous advice. At this period he applied to me, and I find it stated in my notes of the case, that the eyes did not appear to have sustained any serious injury, the iris was rather convex anteriorly, the pupil slightly dull and cloudy and a little contracted, and the eye-ball, perhaps, a little firmer than it ought to have been; but what chiefly arrested my attention was, the confusion of vision of which he complained, the annoyance he experienced from the scintillations and corruscations of light, and from an increased sensibility of the retina. I should also state that, even at this period, although he could see tolerably well for a short time by an attentive and forced effort, yet he could not ascertain the precise outline of objects, their exact shade of colour, and their correct relative distance, without a painful exertion.

---

* *Lancet*, Volume 17, page 899.

*Treatment.*—The first object in the treatment of this case was, evidently, to enjoin an abstinence from labour; secondly, to take away a certain quantity of blood; thirdly, to administer mercury to arrest the action of the capillary system of the retina; and lastly, to institute some active form of counter-irritation in the neighbourhood of the disease. Accordingly, I directed him to abstain from using the eyes much, and to have eight leeches applied to the lower lid of each eye without delay, and to take three times daily two grains of calomel with the third of a grain of opium, and to apply a narrow strip of tartarized antimony plaister directly above each eye-brow. Under the influence of this treatment, and by a steady and due perseverance, more especially in the use of mercury so as to maintain a state of slight ptyalism, vision was very much improved, and this young man is now an attorney's clerk and earns a respectable living by the use of his pen. Had this case been allowed to proceed a few weeks longer, unchecked by any active treatment, it would have become completely hopeless, by the occurrence of those changes which I referred to in my preliminary remarks to "amaurosis consequent on retinitis."

*Amaurosis from the deposition of lymph within the texture of the retina in consequence of a previous state of inflammation.*—Of the various consequences of inflammation of the retina, the deposition of lymph within its texture is by far the most frequent; it is, indeed, an effect of either acute or chronic inflammation, and is precisely similar, as regards the nature of the structural change it induces, to that wrought upon other parts by the intermixture of minute portions of lymph with the natural texture of the part in which its deposition takes place. The retina, under such circumstances (presuming the inflammatory product to be pretty equally diffused) becomes opaque and thickened, and the delicacy of its texture and its transparency are more or less completely destroyed.* The effect of such an alteration in the transparency and other qualities of the retina *to any great extent*, would involve the total destruction of vision, first, because the rays of light, instead of being transmitted through its texture, are arrested at its surface; and secondly, because the nervous structure of the retina is compressed by the morbid deposition; but I have already explained the various effects of inflammation upon the texture of the retina, and the mode in which they operate in effecting the destruction of vision.

---

* HALLER speaks of an organic change in the retina by which it acquires increased consistence, opacity, and whiteness, as though it were by no means a rare affection. *Elementa Physiologiæ*, Tome v.

Case xvi.— — Foye, æt. 17, has been accustomed to study very closely by a great body of light, which, in the course of time, produced a series of symptoms very similar in their character to those of the preceding case, except that there was a greater degree of morbid sensibility to light, pain in the eye and orbit, and tension of the globe, with a most painful and annoying sensation of scintillation. Notwithstanding the existence of these symptoms he continued his avocations as long as he could, until, indeed, he was unable to read or write for more than a quarter of an hour together, and then only by a painful effort. The surgeon under whose care he now placed himself on account of the state of his vision, not being aware of, or not taking the trouble to inquire into, the true nature of the disease from which he was suffering, merely prescribed some simple collyrium and a little opening medicine; but his sight became gradually worse, the morbid sensibility to light ceased to annoy him, and he retained merely an indistinct perception of light-coloured objects. At this period I had an opportunity of seeing this grossly mismanaged case, and of ascertaining the circumstances connected with its origin, the mode of its attack, and the history of its progress, and the effect of the absurd and trifling treatment to which his very serious disease had been subjected; and I felt assured that he was now suffering from the deposition of lymph within the texture of the retina.

*State of the eye eighteen months from the first notice of any imperfection of vision.*—Eye-ball exceedingly firm and tense, and slightly painful; iris, natural in colour, but projected towards the cornea. The pupil was somewhat contracted, but retained its central position and its circular figure, but with a much diminished degree of mobility. The humors of the eye were slightly cloudy and turbid; on looking through the pupil, there was found to be a yellowish or dirty buff-coloured appearance deep within the globe. There was a streaky state of the sclerotica, with a slight arrangement of vessels around the margin of the cornea, such as is generally noticed after choroiditis or retinitis, and which, to a practised observer, distinctly indicates mischief of the deep-seated textures.

This patient was already much reduced in health and strength, and I did not therefore deem it necessary to prescribe bleeding, but I immediately placed an issue in each temple, and directed him to take, three times daily, two grains of calomel with a little opium, to confine himself to the house, and to adopt a mild and easily digested diet. No change was perceived in the state of his vision for nearly a week after he had commenced this plan of treatment, at which time the mouth became affected in a greater degree than I then desired, accordingly he discontinued the calomel pills with directions to resume their use as soon as the sponginess and vascularity of the gums were materially diminished. In a few days he had an increased perception of objects, with a very troublesome sense of scintillation. At this stage it was evident that two important objects had been gained by the mercury, and there was every encouragement to maintain, to a certain extent, its action. It was pretty evident, I think, that the morbid action of the capillary system had been changed, and that the intertextural deposition of lymph was in the progress of absorption. It was necessary in this gentleman's case to maintain the mercurial influence in a slight degree for six weeks, but it was still many months before vision was restored so far as to enable him to write and read.

*Result of the case.*—I am sorry to say that this young gentleman's vision is by no means perfect, and that it is not sufficiently restored to permit him to read or write for a long time together, without being much impaired for many days afterwards. The issues in the temples were kept open for at least six months, when one in the arm was made in their stead, which he continues to wear at the present time.

It appears to me that if I had not been called to this gentleman at that period of his case when, as I have represented, it was first placed under my care; if, for instance, I had not seen him until six months afterwards, the same method of treatment would have been recommended, not indeed with an equal expectation of benefit, but as, even at this stage, constituting by far the most probable means of relief. At what period, after such change has occurred in the texture of the retina, it would be useless and therefore improper to place the patient under the mercurial influence, I am unprepared to state precisely; but this is a most important point for decision, and, whilst the matter is doubtful, the *patient*, and not the *disease*, ought to have the benefit of that doubt. I would not recommend the use of mercury to be continued even in a recent case, after its action had been fully evinced, longer than three weeks or a month, if no change in the state of the patient's vision had taken place, even where the cause of the blindness was as clearly and satisfactorily ascertained as I believe it to have been in the case just related. Persons differ very considerably in the capacity of their system to remove inflammatory depositions; in some, the mercurial influence will effect their absorption after they would appear to be almost as much a part of the system as was the texture in which they were originally deposited; in others, on the contrary, when once deposited, they remain, whatever measures may be taken to cause their absorption. It is this circumstance which renders the question I have just proposed so difficult of being correctly replied to.

*Amaurosis from atonic or varicose enlargement of the central artery of the retina.*—Various inflammatory diseases of the eye are liable to be followed by an atonic enlargement of the branches of the central artery of the retina, such, for instance, as retinitis without leading to organic change, or deposition within the texture of the retina. In fact, any form of inflammatory affection of the eye in which the retina participates, *may* (and more especially if it be protracted and severe) be followed by the permanent enlargement of its vessels.* Various causes increasing the activity of the circulation in the eye and the head—such as great mental excitement, working at a bright fire or by any vivid artificial light, and especially if the objects to be examined are of a bright and glittering character—may cause an increase in the size of the blood-vessels of the retina without exciting any definite condition that can be properly termed *retinitis*. I am satisfied that this cause of amaurosis is frequently overlooked, and I am also convinced that it is a condition of things of by no means rare occurrence.

---

* "Une ophthalmie interne est souvent suivie d'amaurose occasionnée par la dilatation des vaisseaux de la rétine et du nerf optique." DEMOURS. *Traité des maladies des yeux*, T. i. p. 372.—"When the vitreous humor was evacuated from a lady's eye affected with amaurosis, a profuse hæmorrhage came on soon after the operation, which probably arose from a varicose state of the vessels of the retina, as well as those of the choroid coat." WARDROP. *Morbid Anatomy of the Human Eye*, Vol. ii. p. 166.

This form of amaurotic disease is attended with a somewhat enlarged, slightly cloudy, and nearly motionless pupil, muscæ volitantes of various kinds are always complained of, sometimes a sort of coarse cobweb appears to pass before the sight during every pulsation of the heart, and this is most distinctly noticed whenever the circulation is excited; hence it follows, that they are said to be most frequent after dinner. Sometimes distinct circumscribed spots of black matter are perceived to be surrounded by a sort of fine gauze or net-work; but it is evident that the degree of vascular enlargement, and the variations of that enlargement, as respects the increase of particular branches of the central artery, will mainly determine this effect. Sometimes the nutrient artery of the retina would seem to be enlarged and turgid, before it reaches that membrane*—at that part where it passes through the optic nerve—and then the nature of the affection would appear to be indicated by the presence of a single spot (scotoma), which, of course, may differ with respect to its size; and the distinctness with which it is perceived will be decided, in nearly every instance, by the degree of vision which may remain. This enlargement of the central artery of the retina may not be followed—is not necessarily followed—

---

* "Cadaver pauperculæ cujusdam Patavinæ (quæ per viginti annos amavrosi pedetentim invadente laboravit, et tandem cancro mamillæ sinistræ occulto, et medicamentis repellentibus in pectoris cavitatem detruso, miserrimè obiit) delatum fuit in Theatrum Anatomicum, ubi præsentibus multis studiosis, in causam hujus cæcitatis legitimam inquisivi. Aperto igitur cranio, inveni duos anteriores cerebri ventriculos subsidentiam passos, et conglutinatos, per quos spiritus animalis ad oculos deferri non potuit. Unde nervis opticis sensim emarcescentibus (apparebant enim duplo minores, quam in aliis) amavrosis, illæso undiquaque oculo, inducta fuit, benè enim adhuc nutriebatur venis et arteriis rectè constitutis, nisi quod arteria ad oculi radicem ingressa turgebat, adeoque inflammationem quandam, menstruis nempè regurgitantibus insinuabat." SCULTETUS. *Armamentarium chirvrgicvm*, 1656, p. 239.

by a corresponding enlargement of its branches; so that an amaurotic affection produced by an increase in the size of the central artery of the retina at that part of it where it passes through the optic nerve, and one associated with, and caused by, a morbid amplitude of its branches, would differ in their seat—their precise pathological locality—inasmuch as in the former case it would be determined by a cause acting on the optic nerve, and, in the latter instance, it would be determined by a cause operating upon the retina.

It is stated that the central artery of the retina may become aneurismal before it pierces that membrane, and it is quite evident that if this take place, it will, by its compressive agency, cause the loss of vision. I have seen no case of this description myself, nor have any of my medical friends; but it is, of course, a condition of things which may occur.*

I have already referred to the management of those cases of amaurosis which are occasioned by general plethora, and in which the loss or impairment of vision is frequently caused by a congestive and enlarged state of the retinal vessels, and I have but little to say, in respect to the management of those examples of this calamitous malady when of long continuance, which are associated with an atonic enlargement of the blood-vessels which ramify upon the retina unconnected with a state of general plethora. My own practice has furnished me with several examples of this variety of amaurosis which have been certainly amended by the use of some form of active counter-irritation (attended with a pretty copious secretion of pus) in the temples, by the employment of strychnia, and also by the application of electricity. I have neither found free depletion, nor the administration of mercury so as to excite ptyalism, in the slightest degree beneficial, neither have I derived advantage from any astringent, stimulant, or other collyria or unguents, which I have occasionally tried.

---

* "M SCHMIDLER possède une pièce d'anatomie pathologique aussi rare que curieuse: c'est l'anévrysme des artères centrales des deux yeux, chez une princesse de Baden, aveugle depuis longtemps, et pour la cécité de laquelle on avait fait venir à Fribourg, PLENK, RICHTER, et les premiers chirurgiens de l'Allemagne. Elle ne voyait un peu qu'en regardant en dessous; les tumeurs anevrysmales comprimaient les nerfs optiques." *Dictionnaire des sciences médicales*, T. XXXV. p. 20.

*Amaurosis from mental emotions.*—Amaurosis arising from mental emotions does not always occur in connexion with one and the same pathological condition of one part or organ alone. It would not, for instance, be expected that the slow and gradually declining state of vision connected with despondence, and the almost instantaneous loss of sight occasioned by a violent and outrageous fit of anger, would be correctly referred to the same abnormal condition of any one part connected directly or indirectly with vision. It is the effect of continued grief and disappointment upon the system to lessen its tone and diminish its powers, and to blunt the senses and sensibilities to all subjects or objects not bearing a certain relation to the subject or object of distress and dejection; and although the retina may, in particular instances, suffer more than any other part of the system, it will invariably suffer, in a certain degree, in connexion with this depression of the vital powers generally. A sudden burst of passion may operate in different modes:—it may lead to a congestive state of the cerebral circulation, or of that of the eye and head generally; or it may cause effusion of blood, either upon the retina, within the vitreous humor, or upon the brain, and thus produce amaurosis; or it may operate upon the eye or head by deranging the alimentary canal, of which fact the example mentioned by RICHTER, and already quoted, affords a good illustration. In that case the blindness was occasioned by a violent rage, was instantaneous in its occurrence, and was removed on the same day by the administration of an emetic, the necessity for which was pointed out, by "evident symptoms of bilious saburræ." Perhaps there may exist some particularly intimate sympathy between the retina and that condition of the body which is induced by the desponding passions, with which we are as yet unacquainted, and, in the absence of any precise and accurate information upon this point, it is fair and right to argue upon the existence of those pathological conditions which we know to be the almost invariable associates of a slowly and constantly acting cause, producing languor and exhaustion. My limits will not permit me to give an example of amaurosis arising from all the varieties of mental emotion, which my practice has frequently furnished me with an opportunity of witnessing, but the following case, occurring in the person of a most amiable and excellent female, in consequence of the rather sudden death of two promising and affectionate children, comprises as I think, so correct an illustration of the impairment of vision by immoderate grief, that I am desirous of mentioning its outlines.

CASE XVII.—MRS. B——, æt. 60, residing at Handsworth, has been for some time the subject of great mental depression and distress, in consequence of the sudden death of two of her children.

*Right eye.*—The sight of the right eye is slightly impaired; she is constantly troubled with muscæ volitantes, and is unable to read much by artificial light; the eye is apparently healthy except that there is a greenish appearance deep within it, such as is often witnessed in persons at her age; the pupil is of a natural size, and is obedient to the influence of light.

*Left eye.*—Vision is nearly destroyed, but, on looking downwards, she can distinguish the feet of persons who are standing near to her, and can also perceive objects lying upon the ground pretty distinctly. The pupil is expanded and sluggish in its movements, the humors of the eye are rather cloudy and dull, and the eye-ball is rather flaccid —rather softer than the opposite globe; but the eye is not at all painful. Her system is much reduced, her appetite gone, and she has neither strength nor spirits to engage in any avocation. She says that the sight became impaired very gradually and without pain, and that she was much plagued, first with a scotoma, and afterwards with an infinite number of muscæ volitantes which twirled and twisted before her sight in the most odd and whimsical manner, so that she was often disposed to attempt their removal with her hand. Her sight was quite perfect prior to the calamitous death of her children, which she never mentions or refers to but with the strongest indications of the most poignant distress. The sight of this patient was not perfectly restored, neither did it become at all worse; her mind eventually became tranquil and resigned, and her strength recruited under the use, first, of the carbonate of ammonia, and afterwards of the mineral acids. Blisters were applied above the left eye-brow, strychnia was also sprinkled upon the raw surface, electricity was had recourse to, and various stimulating vapours were applied to the surface of the eye, but none of these remedies were of the slightest service—they neither improved nor in any way influenced her sight.

Amaurosis arising from various passions or emotions of the mind does not solely and uniformly depend on any one *efficient* cause; but such cases are always associated with certain pathological states either of the brain or of the retina. For example, violent passion may produce amaurosis by causing congestion of the brain or of the retina; grief and disappointment may lead to amaurosis by impairing the tone of the digestive organs, by deranging the function of other important parts, by lowering the character of the nervous system generally, or by producing an especial debility or atony of the structure of the retina. Here, then, is a class of amaurotic cases, in determining the correct cause of which it is necessary to lay under contribution a most extensive department of pathology.

*Amaurosis from gastric or intestinal irritation.*—The mode in which disturbance of the digestive organs excites irritation in distant parts, the precise nature of the change of which such irritation consists, is involved in much obscurity, and appears to be one of those ultimate pathological facts with which we are not, at least at present, destined to become acquainted. It is, however, quite certain that it does not always operate in the same way, nor by producing, in every instance, the same pathological change. Traces of its effects are sometimes detected on post-mortem examination, in other instances we are left to infer the actual condition of parts on which serious functional derangement depended, in the absence of all ostensible indications of its immediate cause. We have distinct evidence that derangement of the stomach by the presence of a quantity of bile—of a foreign body which has been accidentally swallowed—of undigested food—and of worms, will produce amaurosis; but we are still quite unprepared to explain the precise mode in which this derangement of the stomach impairs or destroys vision. However, we do know that some derangement of the function of the stomach is adequate to give rise to amaurotic affections, because amaurosis of sudden occurrence often ceases immediately after the ejection of a quantity of bile, of undigested aliment, of a foreign body, or of one or more worms; and an assured acquaintance with this fact is of the utmost importance in practice. It would have been most satisfactory to me to have been able to point out the *pathological state* of the organ of vision on which blindness depends in the class of amaurotic affections I am now considering; to have explained the precise mode in which the existence of any source of irritation in the stomach and bowels operates in destroying vision; but I can only surmise that it consists in nervous irritation, and is blended with that intricate web of sympathies which are common to all parts of the system, but which connects in an especial—in a most singular and interesting—manner, certain parts and organs of that system. It is certain, however, that the effects of gastric irritation and disturbance, induce amaurosis, either by operating upon the brain or the retina, and I should say, sometimes by inducing vascular turgescence, or peculiar and active irritation, of one or other of those parts, or by the more slow and intricate operation, termed, nervous sympathy.

Now, this is the class of amaurotic affections in which SCHMUCKER, RICHTER, and SCARPA so strongly advise the administration of emetics, and (after having emptied the stomach) they further recommend the patient to swallow, two or three times daily, fifteen opening pills, prepared according to a particular formula, which I have not thought it necessary to copy. Of course, with distinct evidence of a disordered stomach, containing some irritating matters, the propriety of administering one or two emetics, until their removal was effected, is quite obvious, presuming that no great degree of plethora or vascular congestion were present; and it is equally clear that such treatment should be succeeded by the use of active purgatives and a regulated diet, and that counter-irritation at the back of the neck or between the scapulæ, would also be proper; but, if these remedies failed, it would be right to try the effect of bleeding and of mercury, given to the excitation of ptyalism, if the patient were in a condition to bear it. If the history of any case assures the medical attendant that the amaurotic affection arose from, and depends on, gastric derangement, he ought not to be discouraged from the prosecution of further efforts, if foiled in his first attempts to restore vision; perseverance will frequently enable him to accomplish what a very temporary persistence in remedial measures would not permit him to effect; but I need not enlarge upon the treatment of disorder of the stomach and bowels—and the management of the cases of amaurosis now under consideration consists of little else. When organic disease of the stomach exists, and gives rise to amaurosis, the case is very hopeless, and resolves itself altogether into the management of the more important malady. A patient under my care, who suffered from what I consider to be hypertrophy of the walls of the stomach with great diminution of its cavity and contraction of its pyloric orifice, was blind for nearly a month prior to his death, and suffered from attacks of *periodical amaurosis* of a variable duration throughout the whole course of his fatal and distressing disease. The eyes, the optic nerves, and the brain, were found to be quite healthy, and there existed, on a careful post-mortem examination, no visible cause of the loss of sight in any parts immediately connected with the function of vision.

CASE XVIII.—A child swallowed a small round button, and was soon afterwards deprived of his eye-sight, the parents of the child were, of course, much alarmed at this occurrence, and sought medical relief without delay. A surgeon who saw the child about twenty-four hours after he had swallowed the foreign body, prescribed a dose of castor oil, directing the friends to repeat it at certain intervals until the bowels were freely opened, and to notice particularly the evacuations in order to ascertain whether or not the button was voided. In three days afterwards the mother of the boy brought the button, which had been discharged, and exhibited her child whose vision was perfectly restored. I did not see this case myself and can give no account of the appearance of the eye during the loss of vision. It will be remarked, what I should have mentioned occurred in this case, and what, indeed, very generally occurs when amaurosis arises from the presence of irritating matters in the stomach, namely, that both eyes are equally affected.

*When amaurosis is occasioned by gastric or intestinal irritation, are the characters of the amaurotic affection, as indicated by the appearance of the eye, always the same?*—They are, indeed, very variable, and my observations upon the subject can only comprehend their general outlines. The symptoms derived from the state of the stomach and intestines will usually be far more explanatory and satisfactory than any evidence to be derived from the appearance of the eye. The pupil is almost always dilated, and its motions impaired; vision may be only partially or it may be totally destroyed; the pupil is generally clear, preserves its central situation and its due degree of circularity, and, what is very important, both eyes are, in nearly every instance, equally, or nearly equally, affected. Indeed I do not think it possible for any surgeon to ascertain, from the most scrupulous scrutiny and minute examination of the eye merely, that the amaurosis is produced by a disturbed or diseased state of the stomach and bowels, as distinguished from amaurosis occurring from many other causes.

It has happened under my own observation that an amaurotic affection, produced by gastric and intestinal disturbance, has appeared to produce precisely the same symptoms as gutta serena connected with general plethora, or enlargement of the vessels of the retina; and I have also seen examples of amaurosis so excited in which there has been very serious impairment of vision, with slight intolerance of light, and a contracted and slightly moveable pupil. So that, I apprehend, the more correct mode of studying this part of the pathology of amaurotic affections, with a view to the adoption of correct and scientific treatment, is to ascertain the actual nature of the gastric or intestinal affection, and to trace its effects upon that part of the visual apparatus which it appears more particularly to affect, and to consider the important plan of treatment to resolve itself into the management of the material and primary malady, whilst its details will vary in different instances, as the slightly varying characters of different cases may render necessary. In fact, we must not, if I may be permitted the expression, bind ourselves down to a few prescribed formulas, nor limit our remedial measures to any one given system of management,—to do this to the exclusion of more enlarged and comprehensive views would be, in fact, to place the treatment of ophthalmic maladies in the position it occupied a century ago.

*Amaurosis from various disordered and diseased conditions of the uterine system.*—Uterine disease or disorder is a fertile source of amaurotic affections, and it is obvious that such amaurotic affections will be likely to occur at particular periods of life. In investigating the history of gutta serena occurring in females, it is of the highest importance to ascertain the present and past state of the uterine system. Has menstruation yet occurred, and if so, did that important secretion commence at the proper period? Have any deviations in the natural periods of recurrence of that secretion, in its quantity, or its qualities, occurred? Is menstruation unduly painful, profuse, or protracted? Has the uterine system been recently subjected to unusually great excitement? Has menstruation ceased, and if so, under what circumstances did that secretion finally disappear? Is the patient suffering from any disease of the uterus? Is she suckling? Is she pregnant? How many children has she had? Did she or did she not suckle her children, and if so, for how long a period did she suckle each of them? It will, in many cases, be necessary to ask these and many other questions relative to the same subjects in order to ascertain, as correctly as possible, every circumstance bearing on the patient's particular case. It is quite evident that these several states of the uterine system will not lead to the same pathological condition either as regards the brain or the retina; for instance, the comparative vascular plenitude of the system, the congestive state of the brain and the retina during pregnancy, will be widely different from the condition of those parts under an attack of menorrhagia or from protracted suckling. The former, will comprehend an attack of amaurosis from general plethora and great vascular plenitude of at least a particular texture of the eye; the latter, a state of amaurosis from debility of the system and atony of the retina. MR. LAWRENCE says, "in suckling women, amaurosis is often the result of a fulness of habit, produced by too great indulgence in generous diet, and the use of fermented liquors." He appears to me, however, to be wrong in supposing that amaurosis occurring during the period of suckling *generally* arises from plethora. The case mentioned by RICHTER illustrates the intimate sympathy of the retina with the state of the uterine function. In the instance to which I am referring, a woman, suffering from amaurosis in consequence of amenorrhœa, obtained her sight so long as the catamenia lasted, which was seldom for more than two hours, and that immediately after the application of leeches to the inner surface of the vagina. If amaurosis take place in a girl in whom the menses have not appeared at a proper period, and if she be at the same time strong and plethoric, it would be advisable to commence the treatment of the case by the abstraction of blood and to follow up the treatment by the adoption of measures having for their object the production of the menstrual secretion. In short, whatever may be the exact nature of the derangement of the uterine function, its restoration to a healthy and natural state must be the first object of attention, and I am not aware that such derangement requires for its rectification any particular method—any method different from that which usually obtains—merely in consequence of being combined with the amaurotic affection. However, it is my customary practice to institute some form of counter-irritation either in the neighbourhood of the eye or the loins in all cases of amaurosis connected, as I suspect, with amenorrhœa. SCULTETUS has related an interesting case* in which a gutta serena arising from a suppression of the menses was completely removed by restoring that important secretion and afterwards applying a seton at the back of the neck.

CASE XIX.—"Anno 1632, Maria ROTHIN in Territorio Ulmensi nata, circa vigesimum sextum suæ ætatis annum ob suppressos menses conquesta est de utriusque oculi vitio, quod vulgò gutta serena nominatur. Huic in Nosocomium susceptæ circa novilunium venam saphenam dextri pedis incidi, et sanguinis uncias sex educi curavi. Post catharticorum usum fonticulum femori dextro quatuor digitis supra genu inussi. Elapsis quatuor septimanis, menses cœperunt fluere, sed admodum diminutè quapropter patienti exhibui dosin pilularum de ammoniaco correctarum, à quibus purgatio satis evidenter fuit promota.

---

* Observatio xxxiv.

"Circa tertium novilunium menses apparuerunt, et fluxerunt, sed adhuc diminutè: quamobrem patiens repetiit usum pilularum menses promoventium, á quibus ad nutum fluxere. Quarto mense purgatio justo tempore et quantitate respondit: nihilominus tamen, patiens tristissima, inde visum non recepit. Hinc, quia antehac in Johann. Davidis COMMERELLII charissima conjuge, et Johanne Chunrado EHINGERO setaceum nuchæ inustum ad husmodi nervorum obstructiones præstantissimum inveni, servici setonem applicui, ulceraque per viginti dies aperta detenui, donec ægra pristinum visum lætissima receperit. Mensibus ritè fluentibus, fonticulum in femore consolidavit et ab eo tempore usque ad annum 1645, incolumi sanitate fruita est."

I have many times restored or improved the sight of females whose vision has been impaired or destroyed by the absence of the catamenial discharge, by combining with the other suitable remedies, the use of electricity, as advised by SCARPA, or by the application of strychnia to a blistered surface above the eye-brow, and that too, in some instances, where the catamenia have never been restored. I cannot advise the strychnia to be employed where there is great fulness of the system, where the menses have never appeared, and where the patient possesses great constitutional vigour. Such cases are much better treated by depletion, aloetic purgatives, the use of the warm bath, and by the aid of electricity. Upon this latter mode of treating patients in whom the menses have, from various causes, been suddenly suppressed, SCARPA places great confidence; he says "if these means," (alluding to the application of leeches to the labia pudendi, &c.,) "should not succeed in reproducing the menstrual flux, much confidence may be placed in electric shocks passed from the loins through the pelvis in all directions, and from that part to the thighs and feet repeatedly, and without abandoning the hope of success, although the good effects of this treatment should not be evident for some weeks, since I am persuaded, from experience, that it is one of the most powerful means which we possess, both of reproducing and of accelerating the discharge of blood from the uterus."

CASE XX.—" MISS——, aged 17 years, after a troublesome head-ache, which continued several days, became nearly blind on one eye, so much so that she could only distinguish light from darkness; and every object which she attempted to view, appeared of a reddish hue. Her friends, much alarmed at this sudden accession of so terrible a malady, as the eye had to them a most frightful appearance, immediately made application to the most eminent of the faculty, particularly to such as made the diseases of the eye the principal part of their practice. By accurate examination, it appeared that the chambers of the eye were filled by an opake, dark-coloured fluid, instead of the transparent aqueous humor, and the whole eye appeared suffused with blood.* Considering the disease as local, such remedies were directed as are generally employed to diminish local plethora, and to promote the absorption of the effused fluid. Leeches were applied to the temple, cathartics, blisters, &c.

---

* " On a rencontré des complications de la goutte sereine avec d'autres maladies de l'intérieur de l'œil. RICHTER, entre autres, parle d'un malade chez qui, pendant l'accès d'une amaurose, laquelle affectait un type intermittent, l'humeur aqueuse devenait trouble et blanchâtre et ne reprenait sa limpidité habituelle qu' après la fin du paroxysm." *Dic. des sciences médicales*. T. 19. p. 279.

and she continued to follow these directions, and to pursue this plan of treatment for several months; but as no amendment was perceptible, she became weary of a course from which so little benefit was derived; at length, she was advised by a friend to try the effects of electricity, who requested her to wait upon some practical electrician, and desire him to pass a stream of the aura from a wooden point into the eye daily; which she did accordingly.

"The nature of the case being very fully inquired into, and the progress of the disease, and the methods hitherto used, being very satisfactorily explained by the young lady's mother, it appeared that the blindness was more considerable at some times than at others, previous to which there was generally a considerable head-ache; and that these occurrences for the most part took place about every third or fourth week; and that the disease had from the beginning been attended with obstructed catamenia, which circumstance had been very much overlooked by the oculists who had been previously consulted; but though no menstrual evacuation had taken place, the usual forerunning symptoms had generally occurred.

"I consider that the remedies employed to produce an exciting effect on the uterus should be made use of about the time when the usual symptoms which precede menstruation begin to appear; therefore, in order to divert the patient, but without expecting any real benefit from such a mode of application in a case of this kind, she had, daily, streams of electric aura passed into the eye, and likewise small shocks through the pelvis, waiting till symptoms indicated an effort of Nature to perform her proper office.

"When such symptoms began to appear, as pain in the head and loins, tension of the breasts, &c. the shocks were greatly increased both in number and strength, without informing her of any intention of making such an increase of power; in a day or two the catamenial evacuation took place in a proper manner, and the eye was visibly clearer; the electricity was omitted till the next periodical return of symptoms, when it was repeated; the catamenia again appeared, and the eye very speedily recovered its original transparency, nor did any return of obstruction take place."*

In conclusion, we must endeavour to discover the precise nature of the derangement of the uterine system upon which the amaurotic affection depends, and employ those means of remedying or of relieving such state of the uterine system, which an acquaintance with the principles and details of our profession has assured us are the best, and then have recourse to counter-irritation, electricity, and the application of strychnia, according to the circumstances of the case, always providing that nothing contra-indicating their use be present. I shall not prolong my remarks by entering upon the details of the subject, but let me again state that, amaurotic affections will often depend, not merely on one particular state of the uterine system, but on a great variety of morbid and disordered conditions of that important system, and will be evinced, not only by one given set of symptoms—not by one specific state of the eye and condition of vision merely—but by many and very various conditions of that organ and its visual powers.

*Amaurosis from general debility.*—Amaurosis will be much more likely to occur where the system is suddenly reduced by some profuse evacuation, than when its powers are gradually lowered by some slow, lingering, wasting disease. The system will accommodate itself with comparatively little injury to various changes, provided those changes are not too suddenly and rapidly effected. If the system be suddenly lowered by a considerable loss of blood, profuse diarrhæa, copious salivation, menorrhagia, &c., amaurosis may take place; but their effect upon vision is not to destroy it altogether, but to impair it in a very great degree; and individuals so affected are not generally much annoyed by muscæ volitantes, they can see merely for a short time together, very confusedly, and perhaps only in particular directions. The injury to sight generally occurs suddenly, and there is a sense of aching of the globe if intently occupied in an attempt to exercise the eyes. This state of things is best remedied by the use of various tonics and stimuli prudently employed, with a generous diet and other restorative means; and, as regards other remedies, electricity, the use of strychnia, and blisters are among the most important. However, it may be mentioned, that although amaurosis is more likely to take place where the system is suddenly lowered by some profuse discharge, than when more gradually reduced by a slowly acting cause, yet the amaurosis arising from the sudden reduction of the vital powers is more generally cured, sight is much more frequently restored under such circumstances, than when lost from the more lingering affection, and it is of importance to be acquainted with this fact, especially in connexion with the subject of prognosis.

---

* *Medical and Physical Journal*, Vol. v. p. 68.

I shall now relate the following case which occurred under my own observation, while I was a dressing pupil for my esteemed friend, MR. VINCENT.

CASE XXI.—An Irishman, under the care of MR. VINCENT, at St. Bartholomew's hospital, had begun to take mercury for a syphilitic sore on the prepuce; he had only taken three or four mercurial pills before he became excessively salivated and extremely feeble, his sight entirely left him at the same time, but without being evinced by any change whatever in the state of the pupil, which was neither enlarged nor immoveable—the eye was indeed perfectly natural in appearance. The bowels were immediately opened by a few doses of Epsom salts, and stimulants were afterwards administered; under which treatment his sight was perfectly restored, after having been lost for the period of four days. I believe the amaurosis, which in this case supervened upon the sudden occurrence of profuse salivation, depended upon the debility with which the copious state of salivation was attended, and not upon any gastric, intestinal, or cerebral irritation.

Case xxii.—The following case was mentioned to me by a gentleman in extensive midwifery practice. Mrs. ——, had violent flooding after delivery, to an extent which rendered it doubtful whether or not her life would be preserved, and among other symptoms occasioned by the great loss of blood she had sustained, was a most complete state of amaurosis, attended with enlargement and inactivity of the pupil. The absolute loss of sight lasted two days, dimness of vision remained for nearly a month, and during its continuance the patient was constantly harassed with corruscations of light. Cases illustrative of this class of amaurotic affections are abundant enough, and generally present pretty nearly the same characters and history, almost all of them terminating favourably, and the improvement in vision being, in the general, commensurate with the increase of the patient's strength.

*Amaurosis from suppressed purulent discharge.*—Case xxiii.—" A waggoner, aged 45 years, undertook a journey in wet and cold weather. The discharge from ulcers of his legs, which had for many years continued open, was suppressed and he became blind. Fourteen days after, he was brought to the hospital. He saw nothing, not even a brightly-lighted window. The pupil was oblong and extremely dilated. Beer immediately pronounced the most favourable prognosis, especially as there were present internal sensations of light in the eye, without varicosity and without change in the humors. He had cured more than twenty such amaurotic patients, by restoring the purulent discharge. The material part of the treatment consisted of the following measures:—Sinapisms of the size of the hand to the ulcers of both legs, pediluvia with mustard. The sinapisms were renewed daily, and on the tenth day vision began to return. The sinapisms acted severely on the ulcers, which became deep cavities, with dark coloured edges. In thirteen days vision was almost completely restored."*

*Amaurosis from a carious tooth.*—MR. LAWRENCE quotes (from the *Archives Générales)* the following case of amaurosis from slight injury to one of the teeth.

CASE XXIV.—" F. P. thirty years of age, possessing a good constitution, and enjoying good health, with the exception of pains in the head and limbs, which never lasted long, suddenly experienced, in the autumn of 1825, a violent pain, shooting from the left temple to the eye and the side of the face: he ascribed it to cold. This pain lasted several days, then lessened, and re-appeared from time to time without being sufficiently severe to induce the patient to seek medical aid. In about two months it suddenly increased in intensity occupying the eye particularly, with a feeling as if it would pass out of the orbit. F. P. now discovered that he was blind with that eye, and applied to a neighbouring physician, whose treatment, continued for two months, did no good. The pain, however, was no longer continual: it assumed a somewhat periodical character, leaving the patient easy for some hours in the day. At the end of the following six months the pain increased, the cheek swelled, some spoonfuls of bloody matter were discharged by a spontaneous opening in the lower eyelid, after which the swelling subsided, and the pains nearly disappeared, although the blindness remained complete. The discharge was renewed from time to time, during the following six months, and there was no great suffering. But in the autumn and winter (1826) the pain, particularly in the eye, became so violent, that F. P. came to Wilna in the beginning of 1827, determined to have the organ extirpated, if no other remedy could be found. Professor GALENZOWSKI found the left eye totally insensible to light, with the pupil dilated, and no other visible alteration. The pain, not then so severe, consisted in violent occasional pricking or darting sensations in the left temple, and parts round the eye. There was discharge from the lower eyelid. The first molar tooth of the left side was carious; it had not caused much uneasiness; and the tooth-ache, when it existed, had not coincided with the pains in the temple and eye. The Professor determined on removing this tooth, and having done so, was surprised to see a small foreign body at the extremity of the fang. When drawn out, it proved to be a small splinter of wood, about three lines in length, which had traversed the centre of the tooth and had probably been introduced in picking the teeth. A probe passed from the socket into the antrum, from which a few drops of thin purulent fluid escaped. The pain ceased almost entirely, and, on the same evening, the eye began to be sensible to light. Vision gradually improved, so that, on the ninth day, the patient could see as well with the left eye as with the right, after a blindness of thirteen months: on the eleventh day he left Wilna to return to his family.*"

---

* *Quarterly Journal of Foreign Medicine and Surgery*, Vol. 1. p. 448.

---

* *A Treatise on the Diseases of the Eye*, p. 562.

"On trouve dans **Richter** l'histoire intéressante d'une femme, aveugle déjà depuis bien des années, et qui recouvra la vue pour quelques instans, en se faisant arracher une dent."*

*Amaurosis from irritation of some of the branches of the fifth pair of nerves.*—It will be evident that I cannot give an ample illustration of the various forms of amaurosis which arise from the infinite diversity of accidents which occasionally happen to the respective branches of the fifth pair of nerves throughout their extensive and intricate course, without engaging a much larger space than it may be deemed proper to occupy. An intimate acquaintance with the ramifications and connexions of the fifth pair of nerves will at once indicate the very great difficulty of deciding upon the nature of those cases where a source of irritation evidently resides near, or (where it is not cognizable by the medical attendant's vision) is inferred to reside near, some of the numerous branches of this important and extensively ramifying nerve. There is, however, one form of injury which occurs so frequently that it is particularly desirable to be well acquainted with its influence upon the power of vision—I mean the laceration or the partial division of the supra-orbitary branch of the first division of the fifth pair of nerves.

Now, when it was first noticed that blindness sometimes resulted from a wound in the situation of the supra-orbitary nerve,† it was thought that an injury of this nerve was necessarily followed by the permanent loss of sight; and such appears to have been the opinion of the celebrated Scarpa, for he remarks, that he has never known an amaurosis occasioned by a wound or injury of the supra-orbitary nerve cured, except in one instance related by Valsalva; indeed many of the cases mentioned by Scarpa, as being, in general, incurable, are, by no means, of the unfavourable character he has represented. I need scarcely remark that amaurosis was formerly considered by many surgeons an absolutely incurable disease, thus Maitre-Jan says, " c'est rechercher la pierre philosophale que de vouloir chercher des remèdes pour guérir le goutte sereine; cette maladie est absolument incurable;" and the same opinion is repeatedly stated by authors of his day.

---

* *Dic. des sciences médicales*, T. 19, p. 294.

† It was remarked by Hippocrates, who says, "the sight is obscured in wounds which are inflicted on the eye-brow or a little higher."

Portal, Larrey, Hennen, Hey, and Wardrop have taken a very different view of the prognosis of amaurosis, produced by injury to the supra-orbitary nerve, from that of Scarpa, and the authority of the indefatigable Larrey upon this subject is entitled to the greatest attention, for few surgeons, if any, have had a greater extent of experience than he has had in this particular form of injury. His directions, in reference to the management of wounds above the orbit, prove his very intimate acquaintance with the effects of injury and division of the supra-orbitary nerve.*

It has appeared to me that (from the connexion subsisting between the frontal nerve with the lenticular ganglion)†, whenever amaurosis has followed an injury above the eyebrow, the pupil has been more or less angular, quite immoveable, and drawn from its central position—at all events it has been much less circular than it ought to be. If the pupil has retained its clear black appearance, whatever may have been its figure or the character of its outline, I have not remarked that vision has been altogether destroyed—it has been, under my own observation, more or less seriously impaired, but I have not remarked that it has been absolutely lost. It is, however, necessary to distinguish between a case of amaurosis, occurring *merely after*, and *altogether in consequence of*, a wound of the eye-brow, for it is manifest that the same blow which injured the frontal nerve, may, at the same time, have produced that degree of concussion of the retina, or that amount of injury to the eye, which is quite competent to give rise to complete amaurosis, quite independently of any injury whatever to the frontal nerve.

---

* Dans les incisions, il faut éviter autant que possible la lésion des rameaux du nerf fontal, ou, si l'on ne peut les éviter, il faut avoir l'attention les couper complétement. La lésion, même légère de ces nerfs, entraine ordinairement la perte de la vue de l'œil du même côté, et produit quelquefois le tétanos; on en trouve un exemple dans nos Campagnes; tandis que la section complète de ces nerfs ne trouble point les fonctions de ceux qui servent à la vision."—*Mémoires de chirurgie militaire, et campagnes;* du Baron D. J. Larrey, T. v, p. 181.

† I have previously mentioned, on the authority of the laborious Bock, the visible nervous connexion subsisting between the lenticular ganglion and the retina.

Presuming that a person, had received a small shot in the situation of the supra-orbitary nerve which still remained there, or that he had suffered an injury in that situation from some sharp instrument, and that after a time, vision was entirely destroyed in the eye of the same side, it would be proper in the former case to endeavour to remove the foreign body, and, in the latter instance, to divide the nerve completely, or at least make an incision in the situation of the nerve, quite down to the bone.* I have already mentioned that where a wound occurred in the neighbourhood of the frontal nerve, without, in the first instance, implicating the nerve itself, blindness may supervene in the course of time by the pressure of the cicatrix upon the nerve, or from some change in its position or state of tension effected by the contraction of the cicatrix, and the healing of the wound, and in such case the excision of the cicatrix, and the subsequent division of the nerve, would yield the best chance of restoring vision.

---

* Addebat Excell. Spigelius in lectione anatomica, quam super pauperculæ caput habuit, vitio huic minimè occurri potuisse, licet Pausanias aliquando ex vulnere frontis talem guttam serenam sublatam fuisse affirmet. Scultetus. *Armamentarium chirvrgicvm.* Observatio XXXVI.

Case xxv.—A person received a wound just above the right eye-brow, from a piece of glass, which was removed immediately after the accident by the patient himself; the wound was then dressed with simple dressing. It healed in a few days, but to the patient's great surprise, the sight of the right eye was very nearly lost; he had a painful sensation in the neighbourhod of the cicatrix, and a singular sense of creeping, pritching and quivering of the upper eye-lid, and the integuments of the forehead. The eye was perfectly natural in appearance, except that the action of the iris was sluggish, the pupil dilated and slightly drawn towards the nose. I made a free incision of the parts in the site of the cicatrix quite down to the bone, and all uneasiness at once ceased, the eye shortly afterwards assumed its healthy character and functions, and vision was permanently restored. If, however, the sight, which I have represented as re-appearing soon after the performance of this trivial operation, had declined as the healing process advanced, it was my intention to have excised the cicatrix, not, I must confess, in consequence of any practical acquaintance with the advantages of that mode of treatment, but from the views and with the intentions I have already explained.

I have selected this case from many others of a like nature, on account of the simplicity of its characters, and the extreme facility with which its cure was effected; but it would be wrong to say that *similar* success will result from *similar* treatment in *similar* cases, in every instance in which such treatment may be instituted. What then are the circumstances which determine, 1, the loss or restoration of vision when the supra-orbitary branch of the first division of the fifth pair of nerves has been injured? And 2, the success, or otherwise, of the complete section of the irritated or partially divided nerve? When a wound, made by a sharp clean instrument, occurs in the site of the supra-orbitary nerve, and dividing the integuments and infrajacent parts quite down to the bone, no amaurotic affection will be at all likely to take place; but, if the wound be inflicted by an instrument which is neither very sharp nor clean, if it lacerate and tear rather than clearly divide, if also it merely partially sever the nerve, amaurosis will be very likely to occur, and this will be more likely to happen if a foreign substance be allowed to remain in the wound. If amaurosis supervene on the healing of such a wound, and remain after the complete section of the nerve by an operation, it will be likely to remain permanently, unless the cicatrix be excised; and finally, if the amaurotic affection be permitted to remain a long period before the nerve be divided, or the cicatrix be excised, the amaurosis may still remain, although the same operation, if undertaken at an earlier period, would very probably have effected its removal.

CASE XXVI.—" A gentleman received an oblique cut in the forehead, which, from its direction and depth, must have injured the frontal nerve. The wound was not accompanied by any severe symptoms, and soon healed. But afterwards the vision of this eye began to fail, and in a few months was completely destroyed; the pupil was much dilated, the iris was not influenced by variations of light, and had slight tremulous motions."*

---

* It is possible that, as the iris became tremulous after the accident, the lens might either have been absorbed, or displaced below the pupil.

CASE XXVII.—" A sailor got a blow on the edge of the orbit, from a ram-rod, at the place where the frontal nerve passes on the brow. The vision of that eye was instantly destroyed, and when I saw him several years after the accident, the eye remained amaurotic, with a dilated and immoveable pupil. A cataract had formed in the other eye."[*]

Various organic changes in the branches of the fifth pair of nerves are adequate to produce amaurosis,[†] but it will be remarked that such structural alterations are usually associated with certain morbid conditions of the brain, or of the Gasserian ganglion.

Of course, wounds of other branches of the fifth pair of nerves besides the frontal are liable to be followed by amaurosis. I have observed the occurrence of incomplete amaurosis from laceration and injury to the infra-orbitary nerve; but although I have had occasion to divide this nerve on several occasions in the course of my life, on account of severe *tic douloureux*, I do not remember that the operation has been followed, in any instance, by impaired vision. I can imagine, however, that if the nerve, instead of being completely severed at once by a sharp instrument, had been torn or irregularly and partially divided, that such a condition of things would have been very likely to have supervened.

" Wounds of the infra-orbitary nerve," says MR. WARDROP, " and portio dura, are sometimes followed by amaurotic symptoms. BEER mentions an instance of the former, and I saw an officer in whom a ball wounded some branches of the latter nerve, which was followed by amaurosis."[‡]

---

[*] *Morbid Anatomy*, Vol. ii. p. 194.

[†] See a very remarkable and interesting case of this description related by SERRES in his *Anatomie comparée du cerveau*, T. ii. p. 67.

[‡] *Morbid Anatomy*, Vol. ii. p. 195.

I have thus endeavoured to bring under notice various illustrations of amaurosis which have fallen, for the most part, under my own observation, and which I have blended with my remarks on its pathology; and it has been my anxious wish not so much to detail the various appearances of the eye and to enter minutely into a long and tiresome catalogue of frivolous and petty distinctions usually considered to hold a most important place among the symptoms of amaurosis, but to direct attention to the multifarious sources of the disease, and the manner in which they act in producing a definite morbid alteration, and to explain, as far as I could do so, the precise seat of the malady, and the actual pathological condition of various parts of the eye and of the nervous apparatus connected with vision, on which the amaurotic affection, in particular cases, depends.

# CHAPTER XVII.

## MALIGNANT DISEASES AND OTHER AFFECTIONS OF THE EYE-BALL.

### SECTION I.—SCIRRHUS OF THE EYE-BALL.

The disease I am about to describe under the name of scirrhus of the eye-ball, is usually termed "carcinoma oculi," but I have preferred to retain the term scirrhus, because it is the more correctly descriptive of the actual pathological condition of the various parts of the eye when affected with this morbid change.

Mr. Lawrence remarks that, "the globe of the eye and its surrounding appendages are liable to cancerous affections; to that kind of altered structure, which in its origin, progress and symptoms is similar to the disease occurring so frequently in the female breast, and which may take place in most other parts." Scarpa and Frick take a different view of the subject, and represent the disease as commencing with a soft fungous growth, which degenerates into a firm scirrhous mass. The following is Scarpa's statement;—"the exterior fungous excrescence of the eye, while it is soft to the touch, flexible, and pulpy, although accompanied with symptoms similar to those of carcinoma, is not actually so; nor does it become malignant and strictly cancerous, until after it has become rigid, hard, coriaceous, warty, and in every respect scirrhous." Frick remarks that, "in carcinoma (of the eye) on the contrary, the extirpation may be resorted to with the greater prospect of success; especially if undertaken before the fungus has passed from a state of softness, to that of a carcinomatous or scirrhous hardness." I do not think that either of these last mentioned writers have given any approach to a correct history of the malady under consideration, and am quite at a loss to discover any affection of the eye which corresponds with their description of "carcinoma bulbi." However, it must be considered when reviewing former opinions respecting malignant disease in general, that the term cancer had, until a comparatively recent period, a very indefinite and extended signification, and was very generally applied to every form of malignant and intractable, or, very rarely tractable, disease; thus, BICHAT, in his edition of DESAULT's surgical works, observes;—"le carcinome de l'œil attaque tous les sexes, se manifeste à tous les âges; cependant il semble, plus que les autres tumeurs de cette nature, s'attacher à l'enfance."* It is quite evident that that zealous, learned, and talented individual was confounding, under the term cancer, almost every malignant affection to which the eye and its appendages are liable; such, for instance, as scirrhus, fungus hæmatodes, and melanosis of the eye-ball, and also carcinomatous and various other forms of malignant ulceration of the lids.

Before I enter upon the consideration of the scirrhous affection of the eye, I am anxious to direct attention to the fact, that various diseases have, by different writers, been included under the term *carcinoma oculi*, and also that medical men are by no means agreed as to whether the eye-ball is, or is not, under any circumstances, the seat of true cancerous ulceration.

---

* *Œuvres chirurgicales;* de P. J. DESAULT, T. ii. p. 102. Paris, 1801.

Of the many thousand persons whose diseased eyes I have examined and treated, I have never yet seen a single case of genuine carcinomatous ulceration of the globe of the eye, but I have, on several occasions, witnessed a state of disease, which I have termed scirrhus, because it is attended with great local pain, occurs in advanced life, is connected in the general, when of long continuance, with a constitutional affection, and has a tendency to involve surrounding parts, and is from the first characterized by a shrinking and uncommon induration of the affected organ. The term scirrhus of the eye-ball is then intended to apply to a shrunken, indurated state of the eye-ball, which, on minute examination, is found to be converted into a solid compact mass, the section of which exhibits the membranous striated appearance so peculiarly characteristic of scirrhous induration in other situations.

*Origin and progress.*—Scirrhus of the eye-ball is usually preceded by an attack of inflammation, indeed the diseased organ will generally be found to have been the seat of inflammation on many former occasions, the last attack of which is usually painful and protracted; the cornea now becomes rather flattened and hazy, the sclerotica puckered and contracted, and the power of vision seriously impaired; there is at the same time great pain in the eye-ball, and in the face and head of the affected side; there is also free lachrymation and a spasmodic action of the orbicularis muscle, independently of any great intolerance of light. As the disease advances, the following changes are discovered in the eye;—the cornea is flattened and shrunk, as though it were diminished, not only in convexity but in the extent of its surface; its colour is rendered hazy or brownish; the vessels of the conjunctiva are varicose; the sclerotica assumes a dusky yellowish-brown colour; the eye-ball is much diminished in size, and is the seat of extreme pain; there is increased lachrymation, with a constant forcible contraction of the orbicularis muscle, so that the lids are continually and spasmodically closed, and vision is wholly destroyed, although the patient may still experience very annoying sensations of scintillation. When these changes have occurred in the eye, there is in general a good deal of facial neuralgia, and intensely severe hemicrania. The constitution also suffers, the patient emaciates, the countenance assumes a dingy yellow, or slightly cerulean hue, and the system becomes more or less enfeebled. Finally, the cornea loses all traces of its natural characters, it becomes merged, as it were, in the change of structure which the immediately surrounding parts have undergone, and is only distinguished from the sclerotica, by possessing a pale blue tinge; the eye-ball is changed into a small convex body, having a puckered uneven surface, or, in other instances, it is converted into a nodulated tumour of a firm texture, and of a brownish-yellow colour. The eye is no longer freely moveable in its socket, but is limited in its motions, the orbital cellular membrane becomes indurated and tuberculated, the eye-ball contracts adhesions to it and to the orbital periosteum; the bone itself, in severe cases, is ultimately involved and is rendered carious. The orbital adipose substance, upon which the eye-ball is cushioned, is indurated, and the muscles of the globe are diminished in size, their texture is remarkably firm, and they are of a pale ashy colour. If this state of things be allowed to continue—if the globe of the eye and its muscles, and the orbital adipose tissue have become alike firm and scirrhus—the glandular system may become affected, other parts may become involved, and very probably the disease will extend along the course of the optic nerve, and destroy the patient, after having produced a degree of agony, which is only supportable by placing and retaining his system under the influence of opium; which objects can alone be accomplished, under these circumstances, by giving that narcotic in very large and frequently repeated doses.

I have never yet seen the absorbent glands affected with scirrhous induration, in consequence of this disease of the eye-ball, but it is stated that they are sometimes so affected, and that I can readily enough imagine, although they do not frequently become materially enlarged and indurated, merely from the circumstance of their contiguity to parts affected with scirrhus.

So long as the disease is limited to the eye-ball, there is no morbid discharge of any importance produced, there is a mere increase of the lachrymal secretion, which may or may not be changed in its qualities, but there is none of that fetor, so strongly characteristic of carcinoma, when situated in any external part. It has been represented that this disease may destroy life in various ways, but it may certainly remain for many years without leading to a fatal result. It may destroy life simply by the extension of its morbid action; by the exhaustion consequent on the pain with which it is invariably attended; and by the constitutional irritation to which it may give rise. It may also be combined with scirrhous disease in other situations, and constitute merely a small part of that amount of disease which causes the destruction of life.

I have formerly stated, when representing the progress of scirrhus of the eye-ball, that the humors of the eye are absorbed, that the globe of the eye is diminished in size, and that the cornea is flatter and smaller than in its healthy state, and so changed in colour, and in its other anatomical characters, as scarcely to be recognized, except by its situation. It (the cornea) is of a yellowish colour, and is much thickened, but there is still a slight dark tinge in various parts of its texture by which it may be distinguished by a close observer, from the sclerotica; the sclerotica is greatly thickened by intertextural deposition, and it is also rendered very firm, and of a brown or yellowish colour, and if a section of it be made, its proper texture will be seen to be interlaced with bands of a firm white substance. Now, the contents of this thickened, indurated, and otherwise changed sclerotica, possess no similitude to those solid and fluid matters, which are present in the natural and healthy state of the eye—there is no appearance of either a healthy or changed crystalline lens, and the new substance which occupies that part of the globe formerly occupied by its humors, consists of a firm solid mass, of a yellowish colour, interlaced with fibrous matter, which possesses the same characters as the white cellular bands noticed in the section of a scirrhous breast, except that they are more numerous and more linear, they are finer and narrower, and, I may add, rather less distinct than the membranous bands, observed in a section of the scirrhous formation in the mamma.

*Age at which it occurs.*—I have never seen scirrhus of the eye-ball take place prior to the age of forty, and it generally occurs in females at the time the catamenia cease, or at some after period of life. I do not know that it has any characters different from those of scirrhous affections generally, except its indisposition to proceed to ulceration,* a circumstance which is readily explained by a reference to the anatomical qualities of the textures in which the disease exists; for, it will be remembered, that the cornea is changed in its anatomical qualities, that the humors of the eye are absorbed, and that the sclerotica is, of all the textures of the body, perhaps the least prone to accept the ulcerative process. In stating that the humors of the eye are absorbed, I may mention that, in the few dissections I have made, no trace of the humors was discovered, but in their place, there existed a firm brownish-yellow substance, intermixed with white membranous bands, but the quantity of this substance, which occupied the situation of the absorbed humors, was very inconsiderable, by no means equal in volume to that of the humors in their natural state, and hence the shrinking of the globe of the eye, when the seat of scirrhous alteration.

---

* An indisposition on the part of scirrhus to admit the ulcerative process is by no means peculiar to the scirrhus affection of the eye; the same circumstance may be noticed in scirrhus of the brain, of the pancreas, &c.

*Causes.*—The causes of scirrhus of the eye-ball are somewhat obscure; it has been said to arise from the carcinomatous diathesis; from local injury, such as severe blows upon the eye; and from repeated attacks of acute inflammation. It is unquestionably correct that scirrhus of the eye-ball occurs more frequently in women than in men, and very often in those females who have not borne children; and it more particularly takes place at, or about, the period when the catamenia finally cease; and, it is also true, that it has followed severe blows upon the eye, and has, in other instances, been preceded by repeated attacks of acute inflammation, or it has occurred in eyes which have long been exposed to some source of irritation, as occurs to masons and various artisans.

*Treatment.*—In entering upon the consideration of the treatment of scirrhus of the eye-ball, it must be borne in mind that the continuance of the disease involves its extension, and that its termination (in those cases where the interference of art has not been permitted) occasions the loss of life, under circumstances of the most painful and agonizing description, but, I may remark, not so much on account of the actual amount of disease of the eye-ball alone, or of pain confined to the globe, but, by the diseased condition of the bones of the orbit, and also by the propagation of the disease to other parts. Every surgeon is acquainted with the tendency of malignant disease to extend its sphere of action—to implicate surrounding and neighbouring parts; and, it may be asked, how is this accomplished? Does the disease (I am now referring to the existence of the malady in some other part, in addition to that originally affected) when occurring in a new situation, originate in a depraved condition of the system, the morbid imbuements of which are determined in the seat of their concentration or visible development by some error, debility or peculiar aptitude of the part in which they appear? Does the constitution become contaminated by the absorption of morbid particles from the diseased mass—the scirrhous eye? It would be going too far into general pathology to discuss these interesting questions, but it is most important to endeavour to ascertain how far the scirrhous affection of the eye is, at first—at its earliest stages—a local affection, and only becoming constitutional in its progress by the absorption into the system of the contaminating particles from the scirrhous organ.

However, without entering further into these pathological questions, I shall, for my present purpose, content myself with assuming that when scirrhus of the eye-ball exists in an incipient state, before it has acquired any adhesions to surrounding parts, and before the orbital cellular membrane is obviously affected, and also before the muscles of the globe are involved in the diseased change (this must be inferred from their capacity or incapacity to execute their functions properly, for, I may remark, that whenever the muscles of the globe are much affected with that diseased change which occurs in muscular fibre in the immediate neighbourhood of scirrhus, they are rendered pallid, grayish, or yellow, they are also wasted and are quite unable to execute their ordinary functions) it would be not merely justifiable, but quite adviseable to extirpate the eye-ball. I am, of course, making this statement under an impression that we are as yet unacquainted with any medicines capable of arresting or changing that process by means of which scirrhus is forming, or, of curing that amount of scirrhous formation which already exists, and that extirpation of the eye-ball affords the only chance of effecting a durable cure. If this be admitted, we have next to consider at what period it would be adviseable to remove the scirrhous eye-ball? Should the operation be attempted as soon as the disease is rendered evident —as soon as we are assured, by existing symptoms, that the disease is actually scirrhus? I believe the operation cannot be performed at too early a period after the disease is once clearly and unequivocally distinguished, and that, on this circumstance depends, in a great measure, the chance of a perfect and permanent cure.

It may be a question for consideration, whether the removal of the eye-ball would be justifiable at a later stage of the disease; whether it would be adviseable to recommend an individual to undergo the pain of an operation after the disease has existed so long that the orbital cellular membrane has become hypertrophied, indurated and tuberculated; after the eye-ball has acquired adhesions to surrounding parts; and after there are present distinct indications of an affection of the muscles; without, however, any detectable enlargement of the glands about the face and the neck, or any appreciable disease of the ossific structures? Now, what will be the condition of a patient under these circumstances? Undoubtedly he will be the subject of constant torture, the body will be emaciated, the constitution enfeebled, and every succeeding day will find him the subject of increased suffering. If we take into consideration, the severe and constant anguish such a person will be sustaining, in connexion with the fact that there is as yet no obvious sign of an affection of the lymphatic glands, or of the existence of similar disease in other parts of the system, and especially that the bones of the orbit are uninjured, and also that the functions of the brain are well and duly performed—it then becomes a fair question if the operation, even under these unfavourable circumstances, and with the little chance it holds out of producing more than temporary relief, is not adviseable. I should even at this stage expect, as direct results from the extirpation of the diseased eye, a relief of pain, and an extension of the period of existence; but, it would be scarcely reasonable to expect that an individual so situated, would be perfectly and permanently cured, either by submitting to an operation or by undergoing any treatment whatever. Of course every stage of the disease beyond this, would prohibit the performance of an operation, and we would therefore limit the period at which the extirpation of the eye, when affected with scirrhus, would be adviseable or justifiable, to that stage, when the bones of the orbit were apparently free from disease, when the malady was not apparently exhibited in other parts of the system, and when the functions of the brain were unimpaired.

This, then, constitutes (as far as any plan of treatment can be so considered) the radical method of treatment; but it would be proper to employ other measures as auxiliary to it, or to adopt other remedial means in those instances where the patient refuses to permit an operation—or where, from the extent of the disease, the surgeon has ceased to recommend it—for the purpose of relieving suffering, or, of rendering that suffering as tolerable as the circumstances of the case permit. Among the first of these remedies, the application of leeches in the neighbourhood of the disease constitutes, in my opinion, one of the most important, that is, when the disease is not very far advanced, and when the patient's constitution is not excessively emaciated and enfeebled, and, whatever may be the prevalent opinion respecting the pathology of scirrhus, I believe it cannot be denied, that we may often suspend its progress by local depletion judiciously employed. A very distinguished pathologist, (ANDRAL,) asserts that the true scirrhus is at its origin, a state of simple hypertrophy of the cellular membrane; and this opinion derives support from the comparative infrequency of scirrhous disease of the eye, for, perhaps there are few organs of the body, which, in an equal volume, contain a smaller proportion of cellular tissue than the organ of vision. In stating that scirrhus of the eye-ball may be merely hypertrophy of its cellular membrane, I should mention that such a state of hypertrophy is not generally dependent on any condition of disease, which would be correctly designated chronic inflammation, but is a simple increase of the part from excessive nutrition and undue development; and this undue development may be owing to mere increased action, which is not inflammation, or, it may be caused by diminished absorption—so that, in point of fact, there may be an actually increased nutrition, or, if I may so speak, an accumulated nutrition of the part. The difference between positive inflammation of a part, and mere augmented function with increased nutrition, may be conveniently illustrated by a reference to various parts of the body, where different tissues or organs are enlarged simply by being excited to increased action, without yielding any of the symptoms, or any of the products of inflammation, and without undergoing any change which corresponds with any of the acknowledged effects of inflammation.

It would be adviseable, then, to apply leeches to the outer or inner surface of the eye-lid, and to repeat them every week or fortnight; their numbers varying with the constitutional condition of the patient. At the same time, the powers of the system should be sustained by a nutritious diet—the bowels should be regulated by mild unirritating aperients, and the patient should be directed to take, twice daily, three or four grains of the sulphate of quina, and in the evening, at least two or three times during the week, a pill consisting of two grains of the pilula hydrargyri, and five grains of the extractum conii; and, when the pain is very severe, it may be necessary to prescribe the hemlock alone, or some other narcotic every night at bed time. With regard to local applications, I believe that a little warm water, or poppy fomentation, or a weak solution of the vinum opii, or, in those cases where there is a good deal of external inflammation, the goulard water, are among the best; but I strongly deprecate the use of harsh and irritating remedies, such as solutions of caustic and various powerful substances, for, although I am scarcely prepared to say with WELLER, BICHAT, and FRICK, that irritating applications to the eye sometimes produce, and occasionally determine the inveteracy of this disease, yet I know they have a very mischievous influence.

In those horrible cases in which the disease is far advanced, and where the sufferings of the patient are excessively acute, we may sometimes produce a temporary period of relief by rubbing a grain or more of opium, mixed with a little of the strong mercurial ointment, immediately above the eye-brow, and this inunction may be repeated twice or thrice in the twenty-four hours, if the severity and the character of the pain render it necessary. We may also, in such cases, give the tincture of opium, the solid opium, the acetate of morphia, or, what is perhaps preferable, **BATTLEY's** black drop, in a quantity, the extent and frequency of administration of which, must be regulated by the patient's suffering; and, in the latter stages of this affection, we are often compelled so to administer narcotics as to keep the patient in a state of partial stupefaction, to render his agony supportable.

In concluding my remarks on scirrhus of the eye-ball, let me again advert to the very great importance of early extirpation—that is, as soon as the characters of the disease are sufficiently distinct to enable us to determine with precision the nature of the disease.*

## SECTION II.—FUNGUS HÆMATODES OF THE EYE-BALL.†

In the year 1800, Mr. John **BURNS** described fungus hæmatodes with much accuracy, and termed it spongoid inflammation, and to that excellent surgeon, to **MR. HEY**, (who wrote some excellent remarks upon fungus hæmatodes, in 1803,) and to **MR. ABERNETHY**, (who included his observations on medullary sarcoma, in his "Essay on Tumours," which appeared in 1804,) the profession is greatly indebted for directing attention to this most important and fatal disease, which, although witnessed, and, in fact, previously described by others, had not been considered as a particular form of disease which occurred with the degree of frequency, and exhibited the regularity of character and history, we now know it to possess; so that in looking over the works of many of the old medical writers, we occasionally find an account of diseased structure, the characters of which accurately correspond with the admitted description of fungus hæmatodes of modern times.

---

* **BEER** states, that five patients out of seven, whose eyes he had extirpated on account of a scirrhous affection, perfectly recovered. There is also evidence in support of the propriety of removing the eye-ball when affected with this disease, in the surgical works of **B. BELL**, **GOOCH**, and **DESAULT**, and in the writings of **TRAVERS**, **GUTHRIE**, and **MACKENZIE**.

† As various names have been given to this disease, I may remark, that the following designations are intended to express the same pathological state, and to apply to the same morbid product:—soft cancer—bleeding cancer—bleeding fungus—carcinome sanglante—fungus hæmatodes—spongoid inflammation—medullary sarcoma—pulpy sarcoma.

Fungus hæmatodes occurs in various parts of the body, and is always characterized by the destructive tendency of its progress, but I am not prepared to say that the morbid structure, termed fungus hæmatodes, which is sometimes noticed in the viscera and the extremities of the adult and aged, is absolutely pathologically identical with that diseased mass which is occasionally found in the eyes of infants, and which is usually, and, I think, properly designated fungus hæmatodes. I do not deny that the diseased mass may be, as I have said, pathologically identical, but there are occasionally evinced some peculiarities in fungus hæmatodes of the eye which fully justify the doubt I have now expressed.

Before entering upon the details of fungus hæmatodes of the eye, I may mention, that the morbid mass so designated, consists of a soft pulpy substance, which varies in its consistence from that of thick cream, to the solidity of firm brain; that its colour is (in various degrees of purity and intensity) either red, yellow, or white; that it is abundantly supplied with vessels; and that its growth is usually very rapid, particularly when it has protruded externally.

*Consistence.*—In stating that its degree of consistence varies, I am not relying on my own experience solely, but am also recording the opinions of every one who has had an opportunity of seeing many cases of this formidable disease; however, it sometimes happens that its consistence is not the same in every part, for it is usually least consistent in the centre, and becomes gradually firmer as it approaches the surface. It has an oleaginous feel when pressed between the fingers, it is dissolved in water, and is indurated when placed in alcohol; if, for instance, we place an eye affected with fungus hæmatodes, (which has been recently extirpated) in water, after having removed the cornea, the fungoid matter will be dissolved, and nothing but the tunic which contained it, and a fine flocculent mass in its interior, will remain; and, as may be perceived in every good preparation, it is indurated in its texture, and the fungoid matter itself, by immersion in spirits of wine, is rendered sufficiently firm to retain its situation within the sclerotica.

*Colour.*—With regard to the colour of fungus hæmatodes, it is more commonly white or yellowish brown, and, in some cases, it is red, which redness may be produced by the original colour of the disease, by the intensity of its organization, or by the effusion of a clot or clots of blood within its substance. MR. WARDROP and MR. TRAVERS state that its colour is sometimes black, and this they attribute to an increase of the choroid pigment, and it is a curious circumstance, that the former of these gentlemen states, in continuation of his remarks upon the occasional black tinge of the substance which constitutes fungus hæmatodes of the eye, that the liver was, in one case, similarly affected. Now, it is quite clear, that if the diseased structure in the eye and in the liver were precisely of the same nature, and possessed exactly the same characters, as they are represented to have possessed, that the black tinge of the morbid mass could not be produced by an increase of the choroid pigment. It is quite evident that both these gentlemen were confounding two separate diseases—they were, in fact, considering melanosis and fungus hæmatodes as one and the same disease, and, with a knowledge that the black melanoid formations existed in many parts, presumed that the peculiarity of colour depended on an increase of a secretion which existed in the eye alone, and which could not, of course, affect the colour of the disease when it existed in other situations. Although I admit that the colour of the morbid mass, constituting fungus hæmatodes of the eye, may be sometimes red, equally red throughout its entire substance, and that this colour may not be produced by any distinct appearance or evidence of sanguineous effusion, I may state, that when the diseased part is red in some parts and white in others, it is then very probable that the red portions are produced by the effused blood, and that the colour of the diseased mass was originally white; but, in such cases, it will be generally found that the redness is not uniform and equal; it will be more considerable at one point than at others, and there will be usually observed a greater degree of redness at the centre of that point, which redness will become less and less intense as it recedes from that central point, until it is gradually lost in the white, or nearly white, structure of surrounding parts. The distinct effusion of a minute portion of blood in the centre of a medullary mass of this description, is as easily detected as the effusion of the same fluid in the texture of the brain, but it will not, of course, acquire a cist, but will be diffused, as it were, in the surrounding texture, and its appearance will vary in accordance with the length of time during which the effusion has existed;—but it is not necessary to point out in detail the variations in appearance which will be produced by the diffusion and degree of absorption such effusion of blood may have undergone.*

*Organization.*—The name of this disease will at once indicate the prevailing opinions in reference to its degree of vascularity, and we cannot fail to remark that the term bleeding fungus, is very aptly descriptive of its hæmorrhagic and other characters. MR. ABERNETHY, in alluding to this circumstance, says, "as the sloughing exposed its vessels, which were large, they bled profusely, insomuch that the students endeavoured, but in vain, to secure them by ligatures, for the substance of the tumour was cut through and torn away in the attempt. Pressure by the finger continued for some time, was the only effectual mode of restraining this hæmorrhage." And MR. HEY observes upon the same subject, "it deserves to be noticed that, at the second amputation, (of the leg) the hæmorrhage from the fungus could not be restrained by the application of two tourniquets to the thigh; yet, after the amputation of the stump, there was no difficulty in restraining the hæmorrhage from the vessels of the thigh by the usual pressure of one tourniquet." Many authors, since the period when both these excellent surgeons wrote upon fungus hæmatodes, have added their testimony to the same effect; and, indeed, active organization and great vascularity, are admitted characteristics of these medullary formations. Now, this hæmorrhagic tendency has been differently explained, for, whilst all agree in the fact, that the morbid production is exceedingly vascular, and amply supplied both with veins and arteries (for, I may here remark, that both venous and arterial hæmorrhage have been observed to occur at the same time, from the same hæmatoid mass) it has been argued that the mere circumstance of enlargement of vessels, so minute as those ramifying in a structure of this description usually are, would be inadequate, *per se*, to produce such copious hæmorrhage. MR. ABERNETHY refers to the profuse bleeding which took place in the first case related by him in his remarks on medullary sarcoma, as proving that, "there is an increase of vessels proportionate to the augmentation of bulk of the diseased part;" whilst MR. HEY refers the same occurrence (profuse hæmorrhage) to a diminution in the natural contractility of the arteries which ramify in the diseased mass. He says, (in allusion to the condition of the arteries in a fungoid structure of the nature we are now investigating) "the contractile power of a sound artery is great. It is very common to see an artery bleed copiously, when imperfectly divided, yet, to cease bleeding immediately, or, in a very short time after a complete division. It would seem that this natural contractility of the capillary vessels, constituting the fungus, was greatly diminished; as a hæmorrhage from them could not be restrained by any degree of pressure which we could make upon the superior part of the limb."* The minute vessels ramifying in a diseased mass of this peculiarly malignant nature and soft texture, are, as I imagine, not healthy, and there is every reason to believe that their natural contractility is diminished, and, it must also be remembered that they are not placed in circumstances equally favourable to the prevention of the escape of their contents, as are the vessels of other parts. In stating that the minute vessels ramifying through a fungoid mass of this nature are not healthy, I may observe, that they are, when the disease is situated in the eye, quite too diminutive for anatomical investigation, unless the fungoid growth has protruded through its tunics, when the process of sloughing and mortification usually prevents us from distinguishing and appreciating any morbid changes they may have undergone; but, as the tunics of the larger arteries, running near to the disease, are sometimes diseased, and their cavity filled with medullary matter, it is very reasonable to suppose that the smaller arteries which actually ramify through the diseased structure itself, would be exceedingly liable to be involved in the same morbid change, or, at all events, to lose somewhat of their healthy properties; and this opinion derives material support from the occurrence of those profuse hæmorrhages which are so well known to occur during the progress of hæmatoid formations, from vessels too minute for observation.

---

* It is stated that among the peculiarities in the colour of fungus hæmatodes, it sometimes presents a gray, and in other instances a pink, and even a reddish-brown appearance.

---

* LAENNEC observes, that the structure of fungus hæmatodes is, "in general, supplied by a great many blood-vessels, the trunks of which ramify on the exterior of the tumours, or between their lobes only, while the minuter branches penetrate the substance of the tumours. The coats of these blood-vessels are very fine and readily ruptured; and this accident gives rise to clots of extravasated blood, in the interior of the tumours, sometimes of considerable size."

From the preceding view of the circumstances which tend to promote the occurrence of free bleeding from hæmatoid formations, and particularly when they have appeared externally, whether the disease be situated in the eye or elsewhere, we are justified in concluding, that it (the hæmorrhage) depends on various co-existent pathological conditions; such as;—1, the intense organization of the part;—2, the softness of the structure in which the vessels are placed;—3, the diminution of their natural contractility; which latter circumstance arises from an attenuation of the parietes of the blood-vessels, and other organic changes induced by the diseased state of the parts around which they are situated, or among which they ramify.

In concluding my remarks upon the organization of the morbid structure constituting fungus hæmatodes, I may mention, that when it is well injected with fine vermillion injection, so numerous, and, at the same time, so minute are its vessels, that it is rendered of a uniform bright red colour, and presents one of the best instances of an intensely organized diseased product with which we are acquainted.*

*Growth.*—The progress of fungus hæmatodes varies—it is sometimes very rapid, at other times, slow in its advancement; it is not, by any means always, equally and uniformly progressive, but may proceed very tardily at one period of its existence, and, at another, with extraordinary rapidity. In a case of fungus hæmatodes related by M. HOIN,† it is remarked, that the "globe of the eye was pushed forwards, and had acquired the bulk of a goose egg. The pain was very violent, and it had only been *fifteen days* since the globe of the eye had begun to enlarge." However, its progress is by no means equally rapid in every case, I have seen it fully developed (having ruptured the cornea, and projected externally) in an infant only six months old: in other instances it has been years from the period of its commencement, to its existence as a fungoid mass which has protruded through the tunics of the eye. But when it has ruptured the cornea or sclerotica, the rapidity of its growth is materially increased, and it will often very speedily acquire a considerable volume, so that any attempts to prevent its increase by the application of caustic, are utterly fruitless. In one case they were tried by MR. HEY, and the following remarks comprehend his opinion of their inutility. "A variety of escharotics were applied, with the view of destroying the fungus, and the morbid surface of the wound. But in vain. The growth of the fungus always exceeded the quantity destroyed. Undiluted oil of vitriol applied liberally, had very little effect."* It appears to me, that the chief reason why the fungus grows so much more rapidly after it has ruptured the external tunics, is the mere circumstance of its being freed from the compression to which it was previously subjected, for I have always observed, on post-mortem examination, that in those instances where the disease destroyed life soon after it had either passed through the cornea or the sclerotica, that the base or first formed portion of the fungus is much firmer and more compact, certainly much less loose and spongy in its texture than that part of it which has protruded externally.

---

* ANDRAL has arranged fungus hæmatodes among the organizable morbid productions.

† *Memoirs of the Royal Academy of Surgery*, Vol. v.

*Age at which it occurs.*—I have never yet seen a perfect and complete example of fungus hæmatodes of the eye in an individual more than five years old,† but it is pretty generally believed to occur at a much later period of life; however, all the best writers upon this subject, and particularly all those individuals who have had much experience in ophthalmic affections, concur in stating, that if it be not a disease absolutely peculiar to infancy, it far more generally takes place at that period than at any after stage of existence; such, at least, is the expressed opinion of LAWRENCE, of GUTHRIE, of WARDROP, and of MACKENZIE, and such we must presume to have been the opinion of BICHAT, the learned editor of the *Surgical Works*, of DESAULT, from the following statement at the commencement of the "memoire sur l'extirpation de l'œil carcinomateaux:"—"Le carcinome de l'œil attaque tous les sexes, se manifeste à tous les âges; cependant il semble, plus que les autres tumeurs de cette nature, s'attacher à l'enfance. L'observation l'a démontré à l'Hôtel Dieu, où plus du tiers des malades qu'y a opérés DESAULT, étoient au-dessous de 12 ans."*

---

* *Practical Observations in Surgery*, by William Hey, p. 292., London, 1810.

† I have not seen the disease begin after the period mentioned in the text, but, as stated in the remarks previously made in reference to the progress of the malady, it may, having commenced at an early period of life, have advanced so slowly, that the child suffering from the complaint may live to be more than six or seven years old. But let me not be understood to say, that its progress is *usually* so slow—it is only very occasionally so tardy in its progress prior to the rupture of the ocular tunics.

I am far from wishing to deny that fungus hæmatodes of the eye may occur in advanced life, but, I may remark, that the instances in which it has been said to arise after the age of forty are much less satisfactory, as regards post-mortem appearances, than they ought to be, in order to be decisively convincing.

With these introductory remarks, I proceed to a detailed description of the disease from its commencement to its termination, from the period at which it is first cognizable, to that stage when it either destroys life by the constitutional irritation it excites, the constitutional contamination it produces, the pain it occasions, the hæmorrhage to which it gives rise, or by the mere extension of the disease to the brain. For the convenience of description I shall divide the history of the disease into three stages. The first stage will include the whole of that period intervening between the first discovery of the disease, by the diminution of vision, and the detection of a glittering shining body situated deep within the eye-ball, to the extension of that apparently polished surface, until it comes in contact with the lens or the cornea—the eye-ball still retaining its natural form, and not having undergone any degree of enlargement. The second stage of the disease will comprehend, 1, the enlargement of the eye-ball, and 2, the occurrence of certain changes in the cornea, and other parts of the globe, preliminary to the *protrusion* of the fungous mass. The third stage will refer to the protrusion of the diseased growth, and to those effects which proceed from its continuance and from its increase.

---

* *Œuvres chirurgicales*, T. ii. p 102.

*First stage.*—Sometimes the attention of the friends of a child afflicted with fungus hæmatodes of the eye is arrested by the occurrence of an attack of ophthalmia—this may or may not precede the discovery of the more important disease, but, when it does take place, the peculiar shining appearance at the bottom of the eye is distinctly noticed, in consequence of the attentive examination that organ generally undergoes under such circumstances, and, the shining appearance seems, to superficial observation, as though it were alone occasioned by the reflection of bright light from the mere surface of the eye, but, on closer examination, there is found to exist a shining, white, yellow, or red substance at the bottom of the globe, which is visible only in particular directions, which is flat or only slightly convex upon its surface, and limited in its extent to a very small part of the fundus of the eye. Now, if the diseased eye be attentively examined, and if the state of vision be tested, it will be found that the sight of the organ is almost or quite destroyed; that the pupil is much dilated; and, perhaps, that one or more of the superficial vessels of the eye-ball are somewhat enlarged. I class the loss of sight among the first set of symptoms belonging to this cloudiness of the lens and aqueous humor—tension of the eye-ball—shining substance of various colours, but generally of a bright light yellow appearance, situated deep within the globe, which may or may not have the ramifications of the central artery of the retina visibly extended upon its surface or diffused through its substance.

*Second stage.*—At this period we find that all the former symptoms are increased; the iris is pressed against the cornea by the lens, which is, very generally, more or less opaque; the convexity of the cornea, which is scarcely perceptible during the first stage of the disease, is now much increased; the eye-ball is enlarged; its superficial vessels are varicose; and (if the lens be not too cloudy) on looking through the pupil the bright polished fungous mass, will be noticed to be in close contact with its posterior surface; the sclerotica, and particularly that part of it immediately around the cornea, is discoloured, perhaps, too, it is knobbed or especially enlarged at one or more points, presenting a series of small bluish eminences; the eye-lids are slightly tumid and pushed forward, and their veins are much enlarged; and, at this season of the medullary development, the little patient will frequently moan and scream from the acute pain and agony he is suffering. And now certain other changes are noticed in the cornea—in addition to its increased convexity, it becomes dull, perhaps attenuated, matter may be effused between its lamellæ, it may ulcerate, or slough. At all events, it will not undergo the same change, preliminary to the protrusion of the fungous mass, in every case; that is, when it does protrude through it, for, I may remark, that the sclerotica will sometimes give way, and permit the escape of the fungus. The fungus may pass through the rent in the sclerotica, but it may still be covered, for a certain period afterwards, by the conjunctiva—the conjunctiva, being capable of great distention may be forced before the tumour, and, by its capability of extension, constitute its outer covering, even after the tumour itself has acquired considerable size. Thus, then, it will be perceived that the cornea may undergo various changes preliminary to the protrusion of the fungus; such, for instance, as attenuation—increased convexity—deposition of pus or lymph between its lamellæ—ulceration—or sloughing. The compression to which the cornea is subjected, may so impair its vitality and elasticity that it is no longer adequate to resist the tendency to protrusion on the part of the fungoid mass, and it may give way under the spasmodic action of the muscles of the globe, and permit the escape of the morbid structure; in other instances, the diseased growth appears to be protruded on the laceration of those layers of the cornea which remain after the detachment of their more superficial ones by the process of sloughing.

*Third stage.*—We have already seen, in the progress of fungus hæmatodes of the eye, as far as we have hitherto traced it, that the eye-ball is enlarged; that the sclerotica, and particularly that part of it immediately around the cornea, is discoloured, and sometimes knobbed or staphylomatous; that the cornea is increased in convexity, and has undergone certain other changes; that the iris is pushed against the cornea by the lens, which is more or less cloudy, and partially absorbed, though generally covered by its capsule; and, finally, that the fungus is either in contact with the cornea if the lens be wholly absorbed, or, if only partially absorbed, very nearly in contact with it. At this, the last stage, the fungus protrudes, and, it may protrude, either through the sclerotica, or, as more generally happens, through the cornea; sometimes it escapes through that part where the cornea and sclerotica are united. If it protrude through the sclerotica, the part cracks, as it were; it is first raised and attenuated, it then assumes a leaden appearance, and, finally, it bursts, and the fungus protrudes; on the contrary, when it escapes through the cornea, that texture does not *usually* crack, but ulcerate, or slough;—it then appears externally, when the ulcerative process has penetrated nearly the whole of the corneal layers, or when the slough of the cornea is detached. The fungus may be small at first, or it may be more considerable; it may bleed very freely, or it may merely discharge from its surface, a reddish sanious fluid. And then, with regard to its colour, it may be at first white or red, or it may possess the various tints to which I referred at an early part of the present section; and, in every instance, the colour of the fungus soon becomes darker, and covered with a thick crust or scab, on the detachment of which fresh hæmorrhage arises; a new scab is then formed, and the bleeding ceases; and this hæmorrhage may so recur, and be so repressed, until death takes place from the exhaustion produced by the loss of blood. It may be expected that the fungus will increase rapidly after it has appeared externally, and such is generally the case, so that in a few days from the time of its first appearance, it will often have acquired considerable magnitude.

I should have mentioned that before the cornea ruptures, the patient is in extreme agony, and that great relief is experienced as soon as the fungus is freed from its confinement. At an earlier stage of the disease the fungus is small, and the humors of the eye are gradually absorbed, so as to prevent that extreme tension of the globe, which would otherwise take place, but, in the stage to which I am now referring, the fungus is large, the humors of the eye are entirely removed by absorption, and the fungus is rapidly increasing in its magnitude, so that all the effects resulting from excessive tension of the globe are experienced in their extremest degree. Now, this is the period at which convulsions are apt to occur—that is, just prior to the protrusion of the fungus externally—and the patient suffers extreme pain, and is often excessively restless; but, instead of being restless, he may be drowsy or comatose—these different states will depend more on various pathological conditions of the brain, than on those of the disease of the eye itself. When the cornea is ruptured, sometimes nothing more than the hæmatoid mass will protrude, in other instances, the crystalline lens will drop from the eye. If the lens be scarcely at all absorbed at the time the cornea gives way, it may occupy the opening in that tunic, and prevent the protrusion of the fungus; but, when the lens is present, being only partially absorbed, it is very generally projected from the eye at the moment the opening in the cornea is formed.

With respect to the discharge proceeding from the surface of the protruded fungus, that will be regulated by very many circumstances, both as regards its quality and its quantity; it may consist of a thin fetid sanious matter, or, of a reddish watery fluid, and, on the slightest injury or laceration of its substance, it will bleed very freely; occasionally it will slough, or a scab will form gradually upon its surface, and, on the detachment of the scab or the slough, hæmorrhage will arise which it may be difficult to check. Now, although the pain is not, at this stage, by any means so great as it was immediately before the protrusion of the fungus, there will be a much greater degree of constitutional disturbance, and, if the child has from some changed action in the vessels of the part in which it is originally developed, than as a consequence of any generally changed condition in the blood itself; but I do not deny that, in some instances, it may occur as a mere elimination from the blood—as a means of freeing that fluid from morbid and pernicious particles. I cannot believe that fungus hæmatodes is ever a second or degenerate stage of scirrhus—a mere conversion of scirrhus into encephaloid matter, as BAYLE has supposed; nor can I agree with MR. LAWRENCE that it is capable of undergoing any change by which it is converted into the black matter constituting melanosis. A section of various eyes in which fungus hæmatodes has proceeded so far as to fill the sclerotica and to protrude externally to a small extent, will exhibit certain variations in the colour of the morbid mass. It may be white like the medullary, or of a faint brown tinge like the cortical part of the brain; it may have a yellow, grey, or faint red appearance—these may be the appearances it possesses when first secreted, or it may assume the latter hue from its possessing only a slight measure of vitality. The more richly organized parts will be of a deeper red, and pretty uniformly red colour; but these appearances must not be confounded with the dense redness occasioned by the effusion of blood, which may take place in such a manner as to spot or streak the texture in which it is effused, or, when existing in larger quantity, it will produce a deep, dark, dull appearance, which becomes less and less, as it recedes from the centre of the effused blood. The cellular web, into which the fungoid matter is deposited, is oftentimes so fine that it can scarcely be distinguished, so that a section of the morbid mass exhibits, as it were, a perfectly even and homogeneous surface, as though it were not interlaced and interrupted by any, even the most delicate cellular threads. In other instances, the fungoid matter is distinctly lobulated, possessing, in different cases, the various shades of colour I have just mentioned.

*Mode of formation.*—When we have an opportunity of examining an eye in which fungus hæmatodes has recently commenced, we often find that a small quantity of the fungoid substance is deposited upon the retina, nearly, but not quite in contact with it, except at one point, where it is identified, as it were, with the part whence it proceeds, or, at least, from the part to which it is attached; and, in a farther stage of the disease, when the fungus mass is still larger, we observe that it does not adhere to what may be termed its parent surface, to a great extent, but that its origin is somewhat pedicular, so that a fine instrument may be passed entirely around its base, except at the limited spot to which I have just referred. We have traced the origin of the morbid growth, and its mode of formation so far, and I think we have satisfactorily shown, that its origin is, in some well authenticated cases, more or less pedicular, and not by any great extent of surface.[*] Of course, if the disease increase, some parts of the eye will become absorbed, and others, which are naturally more or less distant from each other, will be thrown into close contact, so that it may then be difficult to separate them with a view of ascertaining the precise spot whence the disease proceeds, and the extent of its connexion with its parent surface—with that surface in which it commenced, or to which it was first attached; and here the following question naturally arises—does this new production, this medullary fungoid growth, originate in some changed action in the capillary vessels of the part whence it proceeds, which altered action is sufficient from the mere circumstance of its continuance, to explain the growth and the increase of the morbid structure? Or, does it arise from the vascularization of a clot of blood or of some fluid effused by a rupture of the tubes which contained such fluid, whatever may be its nature? Or does it usually arise, as I have already supposed, from a general contamination of the blood? MR. HEY inclines to the second of these opinions, he says, in allusion to an example of fungus hæmatodes, "in this case, the large mass constituting the tumour, appears to have been originally formed by an extravasated fluid, which, in a short time, became organized;—but I shall return to this subject when speaking of the causes of fungus hæmatodes of the eye.

---

[*] This is well seen in the work of MR. SAUNDERS (*A treatise on some practical points, &c.*, plate 2, fig. 6,) and in that of MR. WARDROP (*Observations on fungus hæmatodes*, page 193.)—The dissection of an eye, affected with fungus hæmatodes, is thus described by MR. WARDROP:—" the fungoid mass seemed to have commenced at the point where the optic nerve pierces the sclerotic coat, at least it was connected to that point by a small pedicle, which was continuous with the larger mass, attached to the hyaloid membrane." *Lancet*, v. xi, p. 87.

When the fungoid tumour has arisen, how does it increase? Are the same actions which first produced it competent to effect and sustain its increase? Or, has the tumour, when once formed, the power of effecting its own increase? I think it must be admitted, that the action of the part primarily in fault is not *necessarily* in operation beyond the origination of the disease, and the complete establishment of its character, and that the disease, when once established, possesses in itself a capacity to extend its volume and propagate its actions, independently of that precise kind, and that particular sphere, of derangement, whatever may be its nature or its extent, which in the first instance produced, or permitted the formation of, the morbid growth.

*Texture in which it is first observed.*—I have already mentioned that when the disease has existed for some time it causes the absorption of some parts, and that others are so completely blended and changed, that it is then almost impossible to arrive at any accurate information respecting the texture in which it originated, and I imagine it is in a great measure on this account that we have received from various writers such contradictory statements concerning this part of our subject. Dr. Frick and Mr. Travers say, that the medullary fungus may originate in any of the textures of the eye, with the exception of the crystalline lens and the cornea; and both these gentlemen distinctly specify that the disease may, and sometimes does, commence in the sclerotica. Mackenzie, on the contrary, remarks that the "sclerotica appears to suffer less from this disease than any other part of the eye," and presents us with the following very interesting dissection of an eye, which was removed by Dr. Monteath, to prove that the disease sometimes commences in the optic nerve. "I have now before me an eye, extirpated by the late Dr. Monteath, during the first stage of this disease. Immediately after the operation, I divided the cornea and sclerotica by a crucial incision, and laid back the four flaps. The iris and choroid were entire. I divided them in like manner, laid them back, and along with the choroid, I found that I reflected also the retina, which, though broken, and here and there deficient, is still sufficiently entire to give a white coating to the whole internal surface of the choroid, and has evidently nothing to do in this instance with the medullary tumour, which occupies the whole space of the vitreous humour and the crystalline lens, and *springs from the optic nerve as from a root.* The tumour, enveloped in a membrane similar to the hyaloid, was of the consistence of brain, and of a yellowish white colour."[*] Mr. Wardrop had, many years ago, stated his belief, that the optic nerve and its expansion were the parts in which the disease began, as the following quotation from his work will testify. "It appears certain," says he, "that in all those cases in which the disease affected the eye-ball, we were ignorant of its existence before either the optic nerve or retina were changed." And, again, at page 194, he further remarks, "were we therefore to draw any general inference from observations on fungus hæmatodes of the eye-ball alone, we should be apt to conclude that the disease consists in a morbid change of the *nerve* itself." I may mention that I, to a certain extent, coincide in this opinion, and have no doubt, from an extensive experience in this disease, which has been partly derived from my own practice, but chiefly through the liberality of various professional friends, that the disease, when situated in the eye, does commence, in every instance, in either the retina or the optic nerve, and most commonly in the optic nerve itself at its termination in the retina, or at that part of the retina immediately around the optic nerve. There can be no doubt that the nervous textures of the eye are especially involved in the encephaloid mischief, before other parts are diseased; we may observe this fact, in almost every preparation we

---

*A practical treatise on the diseases of the eye*, page 547.—Mr. Wishart relates a case of fungus hæmatodes of the eye (*Edin. Med. and Sur. Journal*, vol. xix, p. 55,) in which the "origin of the disease in the retina was finely and satisfactorily illustrated." In the fortieth volume of the same work, he thus refers to the appearance of the optic nerve, as exhibited on a careful dissection:—"On examination of the eye, after its removal, the disease was found to be seated in the substance of the optic nerve; the coat of the nerve being very much distended, and evidently forming the outer covering of the tumour, which was of a firm consistence, and resembled the cerebral substance."—A case is related in the *Lancet*, (vol. xi, p. 178,) in which, after the extirpation of the eye, it was found that the "steatomatous (fungoid ?) tumour completely encircled the optic nerve."

examine, and we know that the disease will sometimes appear in the divided extremity of the optic nerve, after the eye-ball has been removed, even though that nerve was apparently quite healthy at the time the operation was performed. In a preparation now before me, it may be observed that the cornea and sclerotica are as nearly healthy as possible, and that the lens is unchanged, except as regards its loss of transparency, although the encephaloid mass is in contact with its neural surface; that a portion of the choroid, and I think, a portion also of the ciliary processes is still visible, but that there is no appearance of the iris, and that scarcely any part of the retina remains; and lastly, it will be noticed that the medullary growth occupies the situation of the vitreous humor, has displaced the lens, and is in close contact with it. But, of course, it would be wrong to infer a conversion of these apparently absent parts into the disease itself. Unquestionably they are removed by absorption, and not rendered undistinguishable because they have lost their natural characters, which are merged, or converted into the disease which we have been hitherto supposing to be an entirely new production. And this leads me to state the changes the various parts of the eye-ball undergo in the progressive development of the medullary growth; and, for this purpose, I will suppose that the disease commences in the retina, close to the extremity of the optic nerve. As soon as the tumour acquires any appreciable magnitude, it produces an absorption of the vitreous humor, corresponding to, or nearly equal to, its own volume, and this process continues until the whole of the vitreous humor is absorbed, and the malignant growth is pretty accurately adapted in its outline to the cavity which previously contained the vitreous fluid.

The next change which occurs, is the absorption of the choroid pigment; the retina and choroid are then removed, the former, however, only in part; but the absorbent process does not continue to an extent adequate to effect the removal of their envelope, for, the dense texture of the sclerotica offers so great a degree of resistance, the power from within is, at the same time, so considerable, that before the sclerotica is materially attenuated, the lens is first pushed slightly forward, and is finally displaced and forced against the neural surface of the cornea, when the pressure it (the lens) formerly sustained is transferred to the cornea. However, I should have mentioned that the aqueous humor is, in a great measure, absorbed, prior to the displacement of the lens, and cannot, of course, be again secreted when that occurrence has taken place, owing to the obliteration of the chambers of the eye. At this period the iris and the lens begin to be absorbed, and they may be wholly or partially removed; finally, the cornea generally, but, sometimes the sclerotica, gives way, and the fungus escapes, and the mode in which these occurrences take place, and the other circumstances connected with them have been previously considered. It will be imagined that whilst these changes are taking place, the globe of the eye will become enlarged, and that great pain will be occasioned by the increase of its contents, the pressure they produce, and the confinement they experience ; and it is to these circumstances chiefly, that the intense pain, and, occasionally, the severe convulsions from which children afflicted with this malady suffer, are to be referred. When the disease acquires a considerable magnitude, all the textures of the eye, with the exception of the sclerotica, are either destroyed or so changed that they can be no longer distinguished.

Having traced the effects of the disease upon those textures of the eye which sooner or later may be said to be absorbed or destroyed by the pressure, and other effects produced by the increasing growth, I will proceed to describe the changes wrought in various parts of its appendages—in the contents of the orbit—in the osseous structures composing the orbit—and lastly, in the brain. If we carefully examine the state of the contents of the orbit when the eye is much increased in size, and before the fungus appears externally, we find that a great part of its cellular membrane is absorbed; that a portion of the adipose structure is removed by the same process; and that the muscles have (not always, but generally) acquired a pale brown colour, and a soft consistence. And with regard to the arterial textures, and particularly those of the ophthalmic artery, I do not know that they have been often found diseased, but MR. HEY states, that in a case of fungus hæmatodes of the thigh "the femoral artery was filled with matter, resembling stiff coagulated blood, which prevented the blood from flowing through the divided vessel;" and ANDRAL has well pointed out, not indeed the softening of the arterial textures which are diffused through a soft newly-formed structure, but the occasional effusion of blood into organs or tissues, which are rendered soft from morbid action. The bones of the orbit may become soft, pulpy, and red, or they may assume the same variations in colour and consistence as the morbid production in the eye; and finally, the optic nerve, the lenticular ganglion, and the brain itself, are subject to the same medullary change as that which affects the globe of the eye; and, in the latter stages of the disease, very extensive disorganization may occur in these parts—an extent of disorganization which prevents us from accurately ascertaining the morbid changes which many parts have experienced.

Now, it is a curious fact that the disease is frequently limited to one eye, and in such case the optic nerve of the diseased side may, or may not be affected; it is often enlarged and softened, and the matter of which the enlargement is composed, may be expressed from the cellular membrane, and the neurilema which contains it. However, the changes in the optic nerve are not always of the same character;—it may be diminished in size, and converted into a soft reddish substance, but the red spots so generally found in the medullary growth in the eye, and which have been represented as consisting of effused blood, are seldom observed in the optic nerve; again, the optic nerve may be so altered as to be confounded with its neurilema, or, its fibres may be separated by the fungoid deposition. And as regards its magnitude, that will vary from the size of a mere thread, to the thickness of the thumb, except, of course, at that part where it passes through its ossific aperture. When the brain is affected, the change it undergoes is precisely the same as that which occurs in other parts—it is rendered soft and pulpy, but its colour and its consistence will vary. The parts of the brain most liable to undergo this fungoid change, are those in the neighbourhood of the optic nerve, the optic thalamus, and the parts around it. The dura mater or the pia mater may also be involved in the same morbid change. Of course it may exist in other parts of the body at the same time, and in one of the cases related in my remarks on fungus hæmatodes of the eye, in the sixth volume of the *London Medical Gazette*, the bones of the orbit, many of the ribs, the liver, the kidneys, and the mesenteric glands were affected with the medullary change, and there were also several nodules of brain like matter in the cellular membrane, which connects the scalp with the pericranium.

The absorbent glands in the neighbourhood of the eye, sometimes become enlarged and changed into a medullary structure, which is contained in a distinct capsule; but they are not frequently so affected. And when this event takes place, the natural structure of the gland is absorbed by the deposition of medullary matter, and the external covering of the gland constitutes the capsule of the encephaloid tissue. MR. WARDROP says, and his remark is in perfect accordance with my own experience, that when the absorbent glands become affected with fungus hæmatodes, the patient generally dies before the skin ulcerates, but that when ulceration does take place prior to the patient's death, no fungous tumour is projected from it—it does not give rise to any luxuriant growth. The glands immediately in front of the ear, and beneath the lower jaw, are those which usually enlarge, when fungus hæmatodes attacks the eye primarily, in those instances in which the glandular system becomes affected, but they have been noticed to be enlarged within the orbit, and upon the forehead, and also in parts more remote from the original site of the disease.

The lachrymal gland does not evince any disposition to become affected; it is sometimes absorbed, and, in other instances, projected from the orbit, but, confining myself to the results of my own observation, I should say that it does not become affected with fungus hæmatodes. It is very possible that the dissections of others may be opposed to this statement, but I cannot now call to mind any author who has mentioned the occurrence of fungus hæmatodes of the lachrymal gland, either as a primary, or as a secondary affection.

Having pointed out the part in which, according to my observation, fungus hæmatodes of the eye commences, the next inquiry is, does it arise in the cellular texture of the retina? I have already explained, that we must not regard fungus hæmatodes of the eye as a conversion of any of its proper and natural textures, but as a secretion from the vessels of certain tissues of that organ, so that the real question for consideration is, do the vessels of the cellular or the nervous matter of the retina secrete or deposit the substance termed fungus hæmatodes? If we admit the pathological identity of the matter, termed fungus hæmatodes, as it occurs in the eyes of infants and in various parts of the body in persons of mature age, we shall, of course, be unwilling to admit, that when fungus hæmatodes takes place in the eye the morbid production proceeds from the vessels of the nervous matter of the retina; and, inasmuch as cellular tissue enters largely into the composition of almost every part and every organ of the animal machine, we shall acknowledge in that circumstance a powerful argument in favour of what I believe to be the fact, namely, that the encephaloid matter is deposited by the minute vessels which ramify in the cellular membrane which enters into the composition of the retina. But, of course, this explanation only refers to the origin of the disease, for I have previously pointed out my reasons for supposing that the disease, when once produced, may progress and acquire increased volume by the mere agency of those vessels which, in the first instance, rendered it an organized substance.

*Causes.*—The causes of fungus hæmatodes have been generally divided into two classes—the exciting and the predisposing. To the former class of causes various sources of local injury have been referred, and under the latter class of causes have been arranged, particular derangements of health, and certain constitutional tendencies or peculiarities, such as a disturbed state of the stomach and bowels, impaired or disordered health, a scrofulous constitution, and so on. We will just inquire into the grounds of these opinions; and first, with regard to what are termed, the predisposing causes of fungus hæmatodes of the eye. Although SCHMIDT, and others have stated, that fungus hæmatodes of the eye is connected with a strumous habit of body, MR. MACKENZIE is, as far as I know, the most recent author who has gone so far as to repeat this statement in a decisive tone. He says, "the children who fall victims to fungus hæmatodes of the eye, are generally of a well-marked strumous constitution;" apparently forgetting that when fungus hæmatodes attacks the eye, it almost invariably occurs at an age when scrofula has not begun to indicate its presence in the system; and further, that when the hæmatoid disease appears in other parts of the body, it very commonly occurs at that period of life when external scrofulous affections cease to appear, and when the strumous action has seemed to have been almost totally exhausted—I allude to the middle and the advanced periods of life.* In examining the works of ABERNETHY, and HEY, with a view of ascertaining the age and constitutional condition of those persons who were the subjects of fungus hæmatodes, and whose cases were related by those excellent writers as illustrations of their remarks respecting this terrific malady, I can find nothing to warrant a supposition that they were the subjects of any local disease, having for its cause, a scrofulous diathesis, or, that they were naturally of a strumous constitution. I may further remark upon this point, that the infants who are the subjects of fungus hæmatódes of the eye, are often remarkably healthy in their appearance, are the offspring of robust parents, and if such infants have brothers and sisters, we find that none of them have suffered from a similar affection;*—so that if it can be imagined that a fine apparently healthy infant, born of robust parents, whose previous children have been free from any similar disease, is, when the subject of fungus hæmatodes of the eye, the subject of such disease owing to a strumous constitution, (the effects of which, it must be remembered, are perhaps developed four or five days after birth,) it does appear to me, that the individual who entertains such opinion is content to embrace it on grounds so slight and so unsatisfactory, that on any other point of professional investigation he would at once admit their insufficiency.

---

* MR. TRAVERS says, "to me the medullary species of cancer has often appeared to be the modification of cancer by scrofula; *i. e.* a disease arising out of the combination of scrofula and cancer in the habit." *Medico-chirurgical transactions*, Vol. XV.

The exciting causes, as I have before mentioned, have been all referred to local injury, and among those who have written most ably and elaborately upon this subject, many of them have conceived that this encephaloid affection often arises in consequence of the infliction of a blow upon the eye. MR. WARDROP says, that "in a great proportion of the cases, the history of which he had been able to collect, the patient had received a blow, which brought on inflammation; and after the inflammation had continued, in some only a few days, the coloured substance became perceptible at the bottom of the eye." I do not coincide in this opinion, and the experience I have acquired since the publication of my papers upon this subject, has fully confirmed in my own mind, the accuracy of the view I then took of the cause of this disease.

---

* A very distressing exception to this rule has recently occurred in the neighbourhood of Birmingham.

In the papers to which I have just referred, it was stated, that fungus hæmatodes of the eye is sometimes developed so soon after birth, that its origin must have been coeval, or almost coeval with that event; that it took place in instances where no blow had been received in the recollection of those who were continually with the subject of it, from the period of the infant's birth to the time of the detected invasion of the disease; and, lastly, that blows upon the eyes of animals would not produce a similar disease; although it is certainly possible to excite somewhat similar appearances to those produced by fungus hæmatodes in its early stage, by injuring the eye, and by that means giving rise to sanguineous effusion, or lymphatic deposition, which, on becoming organized, may yield an appearance somewhat resembling that observed at the commencement of fungus hæmatodes of the eye, but quite different as respects the after period of the affection. The latter disease being progressive and affecting the constitution, the former malady, not generally giving rise to any constitutional disturbance, and remaining stationary, or being succeeded by collapse of the eye-ball. I also stated that the stimulus of light might be capable of giving rise to this severe malady, under the following circumstances;—by being suddenly permitted to fall upon the retina, at the period of birth; by being allowed to dwell upon that delicate texture for a long time; and lastly, the nature of the source of the light to which the eye is oftentimes exposed in such cases must be taken into consideration, for, we cannot fail to remark, that it too frequently emanates from candles, or bright fires, to which the eyes of the infant are very closely approached. We may observe, that the children of the poor (for this disease occurs by far most frequently in the offspring of the poor,) are often very injudiciously managed immediately after they are born, by officious persons, who, under the idea of seeing that they are perfectly formed and removing every thing from around the eyes, frequently expose those delicate organs very improperly to the prolonged influence of natural, or, more commonly, of artificial light, at a period too, when the retina is for the first time impressed by its stimulus. I have therefore supposed, that the prolonged impression of a more or less intensely brilliant stream of light upon the retina, immediately after birth, may induce an altered action in the minute vessels of the part, or, that it may lead to the effusion of a small portion of their contents, and thus lay the foundation of the disease.

*Diagnosis.*—There are some diseases with which fungus hæmatodes of the eye *may* be confounded, and I will enumerate the chief of them, before I proceed to point out the best means of distinguishing the one from the other. Fungus hæmatodes of the eye resembles, in some respects, —1, hæmorrhage into the cells of the vitreous humor, and various morbid changes in that humor;—2, effusion of blood or lymph upon the retina, or within the vitreous humor, or the simple organization of those substances;—3, cat's eye amaurosis;—4, other fungoid diseases of the eye-ball, which are not properly referable to this particular form of medullary growth;—5, certain forms of cataract; —6, dislocation of the lens;—7, effusions between the choroid and sclerotica, or between the choroid and the retina;—8, tumours situated behind the eye-ball.

*Hæmorrhage into the cells of the vitreous humor.*—This will take place suddenly, and will be pretty distinctly noticed to succeed, either some violent muscular effort, or concussion of the body, or blow upon the eye, and the effused blood is almost invariably absorbed after the lapse of a certain period. The unpleasant symptoms it occasions are seldom severe, and occur quite suddenly.

*Various other changes in the vitreous humor.*—The vitreous humor may become so much changed in its characters, as to give rise to an appearance more or less closely resembling fungus hæmatodes; and the diseased productions, which so change the characters of the vitreous humor, are, of course, produced by some morbid condition of the hyaloid membrane and the septa which secrete them. MR. LAWRENCE refers, I presume, chiefly to such cases, when he says, "we have seen children at this infirmary (London ophthalmic infirmary) with the appearances of fungus hæmatodes in the first stage, namely, the altered colour of the pupil, the metallic reflexion in the bottom of the eye, and so on. The uniformly unfavourable result of extirpation has deterred us from proposing the operation. Yet, in some instances, very contrary to our expectation, the case has remained for some time in that state, and afterwards, instead of destroying, the globe has shrunk, and become atrophic." MR. TRAVERS has presented us with the following valuable observations upon the same subject:—"The vitreous humor is subject to a complete change of consistence, and a total loss of transparency, the texture of its cells, and its volume and figure remaining; the secretion is converted from a transparent albumen into an opaque substance, resembling curd. In one case it was like ground rice boiled. Although the opacity is visible, the appearance differs widely from that of cataract. While the crystalline remains transparent, the same bright coloured appearance is seen at the bottom or sides of the eye, which is supposed to announce the incipient medullary fungus. In the progress of the disease also, as in the malignant disease, the lens appears to become opaque, and is protruded so as forcibly to dilate the pupil; this becomes fixed, its edge roughened by detached pigment, and the iris convex, so as to give a conoidal figure to the globe. I have seen several cases of a convex and permanently dilated pupil, with a deep-seated opacity of a splendid yellow tint in children, and doubting, from the preceding history, and the child's freedom from indisposition, that such appearances indicated a malignant disease, I have abstained from operating. To my surprise, the appearances have continued stationary for years, unaccompanied with any disorder of the health."* As to the means of distinguishing this changed secretion of the hyaloid membrane and the septa of the vitreous humor, which simulates fungus hæmatodes, I can only say, that it does not enlarge the eye-ball to so great an extent; does not produce the same degree of discolouration of the sclerotica; rarely occurs before the age of four or five; is attended, in the general, with little, and, in some instances, with no constitutional disturbance; does not give to the countenance the same character of the existence of malignant disease; does not propagate its peculiar morbid action to other parts; and very generally remains stationary after it has arrived at a certain stage of development, or terminates in collapse or atrophy of the globe. It does not appear to me that we are able, in every instance, to distinguish, by their visible characters—by a mere examination of the diseased organ—various morbid secretions which are formed by the hyaloid membrane, from true fungus hæmatodes. In both cases, there may be a shining opacity towards the bottom of the eye-ball, with dilated pupil, convex iris, and loss of vision. The superficial vessels of the eye-ball also may be varicose, tension of the globe may be present, and the pain and irritation of the eye may cause simple inflammation and enlargement of the gland situated in front of the ear. If the disease was perceived, for the first time, when the child was five or six years old; if, after having arrived at a certain stage, its further progress was arrested; if the lens was undisplaced, and the child's health was unimpaired, except in as far as might be occasioned by slight tension of the globe, I should certainly incline to the opinion that the disease was not fungus hæmatodes, and should feel disposed merely to watch the case, with a view of ascertaining the occurrence of those decided alterations which would justify further interference.

---

* *A synopsis of the diseases of the eye*, page 207. Third edition. London, 1824.

CASE I.—— HUTCHINSON, four years old, was brought to me under the following circumstances. For some time past the child has appeared to have lost the sight of the left eye, and to suffer from uneasiness and watering of the part. On a careful examination of the affected organ, I perceived that the pupil was immoveable and slightly enlarged, that the iris was a little pressed towards the cornea, that a few of the conjunctival and sclerotic vessels were increased in size, and that the eye-ball was unusually firm and tense. There was also a slightly opaque and polished silvery-looking substance—a substance having the appearance of certain capsular cataracts—within the pupil, and advancing a little towards the cornea.

I prescribed some simple cooling and anodyne applications to the eye, and also directed the child to take at bed time, for a few weeks, two grains of the hydragyrus cum creta, and twice during the day, five drops of liquor potassæ. I told the friends to cause the child to wear a shade before the eyes during the day, and not to expose them to artificial light.

I have had an opportunity of watching this child's case, and a recent examination of the eye enables me to say, that all symptoms of irritation and tension have subsided, and that the changed secretion of the hyaloid membrane continues, but has certainly not increased; so that I am led to infer that the lessened tension of the eye-ball is occasioned, not by the absorption of the morbid secretion, but by the removal of the lens and a portion of the aqueous humor. I am satisfied that in many cases where tension of the globe is occasioned by morbid secretions from the hyaloid membrane, which are not of a malignant character, the lessened plenitude of the eye-ball, which sometimes results from the removal of the cause of such morbid secretion by means of suitable treatment, is solely dependent on the absorption of the humors in front of the diseased product.

*Certain changes in, and depositions upon, the retina.*— The "cat's eye amaurosis" of Beer, which depends on some change in the retina or choroid, may be distinguished by the form of the iris, the age at which it takes place, by the absence of all tension of the eye-ball, and of constitutional disturbance, by the stationary condition of the disease and also its non-extension to other parts. But when, from injury inflicted upon the eye, lymph is effused within it, which becomes organized, it may be more difficult to deduce an accurate diagnosis. In such cases, it is our duty to endeavour to make ourselves acquainted with the facts, that injury has been inflicted, and that the eye was in a healthy state prior to the infliction of such injury; and to connect with these circumstances, the constitutional condition of the patient, his age, and the absence of that amount of suffering which fungus hæmatodes, at a certain stage of development, would be likely to produce. If we were in such case to form a judgment solely by an external examination of the eye, it would, I apprehend, be quite impossible to avoid the frequent risk of error—it would, in fact, be impossible to distinguish, with even frequent certainty, the organized lymph situated at the bottom of the globe, from the malignant deposition termed fungus hæmatodes. I have seen very many examples of this description, but by adopting the preceding means of inquiry and investigation, I have never yet experienced any material difficulty in detecting the true nature of the mischief. Deposition of lymph into the globe which becomes, for the most part, organized and only partially absorbed, usually terminates in atrophy of the eye-ball.

*Other fungoid diseases of the eye-ball.*—There are other fungoid diseases of the eye-ball besides that peculiar one termed fungus hæmatodes, and, in some instances, we can only distinguish the one from the other by their sequel. If, after having arrived at a certain stage of development, they gradually disappear, or if, after having passed outwards by rupturing the external tunics of the eye they are found to enlarge very slowly, and to possess characters different from those usually attributed to the hæmatoid fungus, the nature of the case will be at once determined; but I admit that during the early stages of their increase there are no certain means of distinguishing the one class of affections from the other form of disease. However, the spurious forms of fungoid disease of the eye-ball usually increase more slowly, do not discolour the sclerotica to so great an extent, nor excite so much constitutional disturbance as the true medullary or encephaloid disease of the globe.

I shall relate the following case, in illustration of the difficulty sometimes connected with the diagnosis of fungus hæmatodes of the eye.

Case ii. — Solomon Parsons, æt. 3½, residing near Dudley, was brought to me (on the ninth of July) suffering from a disease of the right eye, which I thus noted at the time I first saw him:—The eye-ball is enlarged and tense and prominent. The eye-lid is swollen and distended—its blood-vessels are very numerous, and are much increased in size, so as to have a somewhat purple appearance. The surface of the eye is very vascular, and the cornea seems to be much raised upon the sclerotica, and appears hazy and dull at its lower part, as though its vitality were impaired. The iris is in close contact with the cornea, and immediately behind it is a yellow buff-coloured substance. The child appears to suffer from tension of the globe, and screams when I attempt to examine the part, as though I caused him great pain. The little patient is a strong, fine, rosy-cheeked child, and has always enjoyed good health. The mother and father are living, but they are both in bad health; they have other children, all of whom are hearty.

On questioning the father of the child, he assures me that he perceived a bright *something* in the eye soon after it was born, and that lately, and especially when the child's head has been in a particular direction, the substance has been so very bright that it has been quite painful to look at it steadfastly. He is not aware that the eye has been struck, or in any way injured.

This patient was brought to me again on the 16th of July, when, as very important changes had taken place in the characters of the disease, I directed the friends to take lodgings in the town, in order that I might remove the eye, if that were deemed adviseable.

*State of the eye on his second visit.*—The eye-ball is more prominent than when I last saw him, it is larger, much firmer, and extremely vascular. The eye-lids are enormously distended, swollen, and vascular. The cornea is covered by a red fleshy substance, so that its outline cannot be distinguished. There is also a tumour in front of the ear, which appears like an enlarged gland affected with simple inflammation.

A day or two after the period when I took the preceding notes of the case, the patient was seen by my friend MR. STANLEY, of London, by my friend and neighbour MR. RUSSELL, and also by my colleagues. If I remember correctly, these gentlemen concurred in considering the nature of the disease to be doubtful, they also considered that it was doubtful whether the enlarged gland was merely augmented from inflammation, or from a participation in the disease of the eye, whatever that disease might be. My friend MR. HANMER, of Chester, also examined the case, and assured me that the disease appeared to him to be fungus hæmatodes, for the cure of which, the extirpation of the eye-ball afforded the only chance. My own opinion of the disease, was quite decided: I felt no doubt from the history of the malady, and from the appearance the eye presented when I first examined it, that the case was one of fungus hæmatodes,* and that an attempt should be made to save the child's life, by removing the globe. However, as I had requested a consultation upon the case, and as my own opinion respecting its nature and the propriety of an operation, was supported by that of only one surgeon who was present, I declined to operate, and the child is now suffering from the complaint in a degree, which I suppose will soon lead to a fatal termination. Should that take place, I shall endeavour to detail the post-mortem appearances at a subsequent part of the present volume.

---

* Had MR. STANLEY and my other medical friends who did me the favour to examine the eye soon after the cornea became so very vascular and obscure, had an opportunity of observing the case at an earlier period, I think it probable that their opinion would have been qualified with a smaller measure of doubt. Had the matter been doubtful in my own mind, I should have given the patient the benefit of that doubt by proceeding to the immediate extirpation of the eye; but feeling convinced, from possessing sources of information, connected with the early stages of the malady, which had not been accessible to the gentlemen who subsequently witnessed the case, that the disease was fungus hæmatodes, and that the delay in performing the operation, had permitted an affection of the glands in front of the parotid, which furnished a real objection to the performance of the operation, I declined to extirpate the globe, until, at least, the nature of the glandular affection was more clearly evinced.

In the preceding case it will be remarked that the cornea was completely obscured at the time I saw the child the second time, although it was perfectly clear when I first saw him; it will also be observed, that although this change in the cornea took place, no fungous growth protruded through its texture or extended beyond the surface of the eye. I have noticed both these occurrences in cases where there could be no doubt respecting the malignant and fungoid character of the disease. It appears to me that it is of importance to notice two circumstances which early arrested the attention of the child's friends:—first, the *appearance* of lost vision of the affected eye, as indicated by a slight drooping of the lid, strabismus, and inattention to objects with that eye; and secondly, the vivid and peculiarly shining substance deep within the eye-ball.

*Effusion between the choroid and sclerotica, or between the choroid and retina.*—Various coloured secretions are sometimes situated between the retina and the sklerotica, and by pushing the former membrane within the globe, may communicate an appearance a good deal resembling fungus hæmatodes. When seen through the pupil, it may be difficult to determine its characters, for, of course, its form, its magnitude, its colour, and the appearance of vascularity will so vary in different instances, that, as far as these circumstances go, there will be scarcely a single character of the malignant disease wanting. I have seen an example in which a yellow-coloured secretion existed between the choroid and retina, the retina itself being thickened, opaque, and excessively vascular, so that on looking through the pupil, the coloured secretion, covered by this vascular membrane, was so peculiarly modified, that, as far as the eye alone was concerned, I do not think any surgeon could have positively pointed out the real nature of the disease, or would have been willing to have affirmed that such appearance was not occasioned by fungus hæmatodes. This state of things was produced by a blow upon the eye, which the patient had received some time prior to his death; which is by no means an infrequent cause of the coloured secretions which occur between the retina and the sclerotica. Unlike fungus hæmatodes, however, the peculiar appearance, occasioned by these coloured effused fluids, is generally noticed at the side and not at the fundus of the globe; it is not of so bright a colour; occurs at every period of life, and not with greater frequency in infancy; does not lead to the same degree of tension of the globe; frequently remains stationary (when treated by depletive means and by mercury) after it has arrived at a certain extent, or leads to atrophy of the eyeball, or causes a nodulated enlargement of the sclerotica, which may or may not burst at its apex, and, after having discharged its contents, terminate in partial collapse of the affected organ. The sequel of the case will, in fact, always determine its real nature.

*Cataract and dislocation of the lens.*—Cataract and dislocation of the lens only resemble fungus hæmatodes of the eye-ball in one or two particulars. There may be a certain degree of similitude in their colour, for the lens may yield a bright yellow, a brown, or a greenish tint, the iris also may be convex towards the cornea, the pupil dilated, and vision may be destroyed, and lastly, there may be great pain in the eye and head; certainly, all these symptoms may be connected with an opacity and displacement of the lens, quite independently of a fungoid disease. But the opacity and displacement of the lens rarely occur in infancy, (I do not refer to the former of these affections as a congenital disease) they do not produce so much pain, nor affect the constitution to so great an extent as fungus hæmatodes would do, and there is not necessarily any enlargement and irregularity in the form of the eye-ball, with discolouration of the sclerotica, nor any important sense of tension so characteristic of an accumulation of the contents of the eye-ball.

*Tumours behind the eye-ball.*—The only mode in which a tumour, situated behind the eye-ball, can occasion any symptoms which can possibly render the case at its commencement difficult to be distinguished from one of fungus hæmatodes, is, by forcing the globe forwards, rendering its humors opaque, and urging the iris, or the back textures of the eye towards, or against, the cornea; but I do not think it necessary to enter upon this subject at all minutely —the risk of error is so exceedingly slight.

An injury to the eye-ball may produce appearances similar to fungus hæmatodes, for instance, a sharp instrument may puncture it, and may give rise to inflammation, and to its product, lymphatic deposition, which may become organized; and in this way we may observe, on an accurate examination of the part through the pupil, a yellowish, brownish, or reddish-coloured substance, which is manifestly nourished by blood-vessels, and which is seated in front of the retina. In such case, there is, however, little liability to error, on account of the manifest relation of cause and effect, subsisting between the injury and the morbid formation in the eye. The inflammation, occasioned by injuries of this nature, is sometimes very acute, but, on the employment of proper treatment, the lymphatic deposition may be removed, and vision may be *sometimes* restored.

Some time ago I saw the child of Scotch parents, named HUTCHINSON, who appeared to me to be blind of the right eye, from the persistance of the pupillary membrane, but I was too much engaged at the time to notice the case so attentively as I wished, and I regret to say that they have not brought it to my house again. In this case there were appearances a good deal like fungus hæmatodes of the eye. The iris was almost in contact with the cornea, and in the place of the pupil there was a reddish substance, having a convex surface, which was pressed towards the cornea, just as though a coloured secretion, within the capsule, existed in a quantity adequate to distend its anterior hemisphere, and urge it, as a convex body, towards the neural aspect of the cornea. The mother told me the disease had existed from birth, and that she had always fancied the child was blind of that eye; she also mentioned that the disease had not increased—being the same when she first saw it, as at the time she brought the child to me. Such is the usual history of cases of this nature, and it comprises a series of circumstances, which will effectually prevent the risk of error and confusion, if properly investigated.

Neither HEY, nor WARDROP, nor TRAVERS, made any distinction between melanosis and fungus hæmatodes, but believed them to be one and the same disease, differing only in the circumstance of colour. MR. LAWRENCE observes, that fungus hæmatodes of the eye and melanosis oculi are essentially the same in nature; and he afterwards promulgates the following extraordinary opinions, respecting the pathology of these two very distinct affections:—

"in this other preparation, which I have pointed out to you before, you see the progress of conversion from the fungoid to the melanoid state."*

*Prognosis.*—I need scarcely say more concerning the prognosis it would be the duty of a surgeon to give in every case of decided fungus hæmatodes of the eye, which had made much progress at the time he is called upon to deliver his opinion respecting its probable result, than simply state, that of all the cases hitherto related, whether the disease has been allowed to follow its own course, or whether it has been removed by operation, there are but few instances in which it has been otherwise than fatal.

MR. WISHART published an account of a clearly-marked case of fungus hæmatodes, in which he successfully extirpated the eye-ball;† and he subsequently details the particulars of a case, in which, after the excision of the eye, it was found, on examination, that "the disease was seated in the substance of the optic nerve; the coat of the nerve being very much distended, and evidently forming the outer covering of the tumour. The eye itself was found perfectly sound, and of the natural size; the previous enlarged appearance being caused entirely by the pressure of the tumour from behind. The tumour was of a firm consistence, resembling the cerebral substance, generally considered of a malignant nature."‡ A year after the eye had been extirpated, it is stated in a letter that the patient is healthy and strong, and that the eye continues perfectly well. MR. MACPHERSON relates an instance of cure after the extirpation of the eye, on account of fungus hæmatodes;[*] and in the *Lancet*, for January 30, 1830, there is an interesting case of fungus hæmatodes of the eye which terminated in collapse of the eye-ball.[†] SCHMIDT has related an instance where the hæmatoid disease of the eye was cured by the sloughing and detachment of the morbid mass. The child afterwards died from exhaustion.

---

* I shall refer to the means of distinguishing melanosis of the eye from fungus hæmatodes of that organ, in the succeeding section.

† *Edinburgh Medical and Surgical Journal*, Vol. xix. p. 54.

‡ *Ibidem*, Vol xl. page. 274.

MR. HUMPHREY removed an eye affected with fungus hæmatodes, from a boy ten years of age. After the removal of the eye, the patient soon became easy, although he had suffered severely before, and he continued well for some months afterwards, when the case was published. "Upon examining the tumour," says MR. HUMPHREY, "the excrescence appeared to grow from the retina, which was become a pulpy mass, filling the whole cavity of the eye."[‡]

The following case, copied from the work in which it originally appeared,[§] is quoted by MR. LAWRENCE, and as it is one of the most recent instances in which fungus hæmatodes of the eye has been said to be cured by an operation, I have thought it desirable to relate its outlines.

CASE III.—"Professor PANIZZA examined an eye which had been extirpated in an early period of the affection, and found an adventitious growth immediately involving the retina, although that tunic and the optic nerve were not changed in structure. The case was that of a lively, robust, intelligent infant, twenty months old, of swarthy complexion, in whom fungus hæmatodes had existed for a month in the left eye, having originated from a serious internal inflammation of short duration, following severe suffering from dentition on the corresponding side of the upper jaw. The eye was natural in size, motion, and state of vessels; the pupil excessively dilated and motionless. Behind that opening appeared a spot of pale yellow, or canary colour, divided into three tubercular eminences, with a red vessel creeping between them. It was best seen by looking laterally at the eye, when it appeared near the pupil; while to an observer placed in front it seemed in the fundus of the globe. Vision was extinct. The diseased organ was removed by DR. DONEGANA six weeks after the beginning of the disease. The résult was most favourable, and the child from that time enjoyed perfect health. The globe was perfectly natural in size and form, but rather firmer than usual: no change was observable in the optic nerve. Through the cornea, which was still transparent, the discolouration behind the pupil was visible, as before the operation. The removal of the cornea, which allowed the escape of the aqueus humor, and that of the iris, which was healthy, exposed the crystalline in its capsule, still perfectly transparent. On looking through the lens, the yellow spot seemed in the fundus of the eye; but when it was removed, we were surprised to see the diseased mass immediately behind, forming part of the excavation in which the posterior convexity of the lens is lodged. The substance was soft and elastic, and its three eminences could be separated a little by pressing with the end of a probe. In order to ascertain more exactly its origin and nature, a portion of the sclerotica and choroid was removed from the back of the eye. As soon as the latter tunic was opened, a yellow fluid escaped with some force, and the tubercular eminences became less prominent. The fluid was yellowish and glutinous; it coagulated in spirit so as to form a pale yellow homogeneous mass. The eye was now placed in spirit to prevent the further escape of this substance. After removing a portion of the sclerotica and choroid, both of which were natural, the interior of the eye seemed full of the yellow matter, which was granular, and reduced into a fine powder by rubbing between the fingers. As the retina did not come into view after removing the choroid, it seemed as if that tunic had degenerated into this yellow matter, which appeared continuous with the optic nerve as its entrance into the globe. Indeed, on lifting the nerve gently, it appeared like a cord gradually expanding into the yellow mass. On carefully removing the latter, I found in the midst of it the retina, shrunk, folded, and reduced into a conical form, extending from the entrance of the nerve to the eminences already described, which were merely prominences of the tunic caused by pressure of the yellow fluid. Hence it appeared that the yellow spot was not a change of structure in the retina, but produced by a yellow fluid collected between it and the choroid, and pushing the retina towards the middle of the eye and forwards. The vitreus humor became diminished in proportion as the morbid deposit increased, and the eye contained only a very small portion. The firm connexion of the retina to the corpus ciliare prevented the yellow fluid from entering the posterior chamber. We can thus perceive how the retina, pressed on all sides by the morbid deposit between it and the choroid, was pushed forwards, so as to form the three tubercular prominences which caused the yellow appearance in the pupil."*

---

[*] *Transactions of the Medical and Physical society of Calcutta.*

[†] The particulars of this case are related by DR. AMMON.

[‡] *London Medical and Physical Journal*, Vol. v, p. 241.

[§] *Sul fungo midollare dell' occhio, appendice*, Pavia, 1826.

Mr. Lawrence has analysed this case very carefully, and has arrived at the conclusion "that a doubt may be entertained whether the disease was fungus hæmatodes." I have scarcely ever been present at a consultation on a real or supposed case of fungus hæmatodes of the eye, in which doubt was *not* expressed, as to its actual nature; so that I do not now expect to find much agreement of opinion on such cases. Even preparations of the disease, which, when first removed from the human subject are represented to have possessed the true characters of the malady, are far from satisfying those fastidiously critical pathologists, who are determined to fix the appearances of morbid structure to one unvarying type, and to reject as spurious all examples which do not strictly accord with it in their minutest details as well as in their more general characters. I am satisfied in my own mind, from a careful perusal of many examples of enlargement of the eye-ball, (occasioned by the development of tumours within it) in which extirpation has been practised with success, that we may include among the number several clearly-marked instances of fungus hæmatodes, in which, had the patients, instead of recovering, died after the operation, it would have been stated that the removal of the diseased organ had failed to avert a fatal termination.

---

* *A Treatise on the diseases of the eye*, page 611. London, 1833.

*Treatment.—Circumstances relating to the propriety of removing the eye-ball when affected with fungus hæmatodes.*—I have already explained that in a paper formerly published,* I recommended an operation to be performed, with a view of attempting the cure of this dreadful disease, as soon as it was rendered evident by its usual symptoms; by making an opening in the cornea, and excising a portion of its texture, discharging the humors of the eye, and removing as much of the encephaloid mass as possible, and breaking down the structure of that small part of it which could not be removed in an entire state ;† expecting that the cavity, which contained the fungus, would then become obliterated, that the eye-ball would afterwards collapse, and that a cure might possibly be produced, by a method less terrible, painful, and disfiguring than that in ordinary use—I allude to the extirpation of the eye-ball; and I adopted this practice from reading of one or more cases in which the fungous mass actually perished and sloughed away, so that the patients perfectly recovered. To bring the matter fairly before my readers, I shall assume that the fungus is perceived at an early stage of its existence; that its characters are decided; and that it is consequently too minute to occasion any material hæmorrhage when detached from its connexions or broken down in its texture. If the greater part of it be removed, and the remainder comminuted, its vitality may be destroyed, suppuration of the eye-ball will probably take place, and the product of such suppurative action will be discharged through the opening in the cornea. It is on the destruction of the vitality of that portion of the fungus which is not discharged by the aperture in the cornea, and on the inflammation excited by the operation, by means of which the natural character of the inner membranes is destroyed, and the eye-ball eventually collapses, that I depend for the cure of the disease. If the disease be limited to the retina, we destroy, by these means, the part from which it arose, and the cavity containing it; and, as I imagine, the chances of success are as great as they can be rendered by the per-

---

* *London Medical Gazette*, Vol. vi. p. 847.

† *Mode of performing the operation.*—I commence the operation by puncturing the cornea with Beer's knife, as if making a small section for the extraction of cataract, and afterwards snip away the corneal flap

---

so formed, with the curved scissors—the portion of cornea removed, should leave an opening in the centre of that tunic, about a line and a half in diameter; through this opening the humors of the eye may be discharged, and, by the aid of the curved instrument (a sort of curette) previously mentioned, the fungus detached from its connexions with the interior of the eye; and, by preserving the patency of the opening, the fragments of the fungus, which cannot be at once removed, but the vitality of which these manipulations will, with tolerable certainty, destroy, may be subsequently discharged.

formance of any operation for the cure or relief of this frightful malady.*

The objections to this mode of procedure have been stated by MR. LAWRENCE, in a spirit of fair and candid inquiry. He says "one objection to it is, that in some cases of the disease, the morbid growth has been found exterior to the globe, as well as within its cavity, even in an early period, and that the optic nerve has been found diseased, even in incipient cases. Again, in operations on malignant diseases, it is an imperative rule to remove, not only all the altered structures, but some of the surrounding healthy parts; unless this is satisfactorily accomplished, the patient has not a chance of safety. How can we feel satisfied on this important point in such a mode of proceeding?" †

To the first of these objections, I have to remark, that I am by no means satisfied as to the facts on which it is founded—I am not aware that true fungus hæmatodes of the eye is developed at the same time within and without the eye-ball. I have seen the disease commence in the optic nerve, and in the cellular membrane and parts around it, but, I have never observed that at an early stage of the disease, it is evinced within the globe and exterior to it at the same time. As therefore my operation has reference only to the early stages of the malady, and as, at an early period of fungus hæmatodes exterior to the globe and in the immediate neighbourhood of the optic nerve, there are no distinct appearances of the malady noticed on an external examination of the eye, it is quite evident that the objection of MR. LAWRENCE, can only be entertained by extending the application of the decried operation to a presumed case to which I have neither considered nor represented it to be suited. The second objection of MR. LAWRENCE is more plausible than sound, more apparent than real. It is quite true that in malignant diseases in general, we are, as he has stated, solicitous to remove, not merely those parts which actually compose the disease, but also those other parts which immediately surround it; but I submit that the case under consideration furnishes, in this respect, at least at its early stages, an exception to this general rule, for, as my method of management presupposes that the disease is contained within the globe, (and if it be not it will not yield the appearances necessary to communicate to us the proper distinctive characters of the disease which would justify the performance of an operation,) that it is in an incipient state, and that the fungoid growth is very small, it cannot be supposed that whilst the sclerotica is entire and retains its integrity, the disease, its firm fibrous texture so securely envelopes, can contaminate the parts exterior to it—parts with which it has at present no connexion. One of the best marked instances of fungus hæmatodes which has ever been recorded, and the dissection of which was conducted by JOHN HUNTER, well illustrates what I may term, the prolonged opportunity this disease generally affords us of trying our curative measures before it has extended to surrounding textures, and especially before it has affected the orbital cellular membrane. The disease in the right eye had existed for about a year, and it is stated by MR. HAYES, the narrator of the case, that "the optic nerve seemed quite sound through its whole length; the eye-ball, when cleared of the muscles, cellular membrane, &c. had just the common appearance. MR. HUNTER took off the upper part of the sclerotica, choroides, and retina, with as much of the vitreous humor as was contained in this section, and, by that means, exposed the cavity of the eye. We found the coats and retina perfectly sound, and the crystalline humor in its place firm and transparent; but in the place of part of the vitreous humor, was a whitish curdly substance, which lay in the posterior and outer part of the cavity, and had pushed the vitreous that remained to the anterior and inner part of it."*

---

* I find that the plan I have suggested for the cure of fungus hæmatodes of the eye, without extirpation of the globe, has been previously advised, if not decidedly and urgently recommended, by MR. HAYES. After having very clearly and circumstantially detailed a case of fungus hæmatodes of each eye, he proceeds to remark, "I should not have attempted offering a case of this sort to the public, it having been so unsuccessfully treated, and so little understood, had not the dissection rendered the appearances more intelligible, and pointed out the immediate seat of the disease. If this could have been known, and the eye emptied, before the coats were at all affected, might not the life of the child have been preserved? for, by the dissection of the right eye, the disease appears to have arose in the vitreous humor only, and to have been confined to this part several months, while the other parts of the eye remained, in all appearance, perfectly sound."—*Medical observations and inquiries*, Vol. iii. page 137.

† *A treatise on diseases of the eye*, page 625.

I have occupied some time in stating and explaining the views on which I have founded my convictions of the propriety of an operation for the cure of fungous disease of the eye, which, in some instances, may, as it appears to me, advantageously supersede, and render quite unnecesary the extirpation of the globe, and, at the same time, give to the subject of the malady, an equal security against its return. Adopting these views after much deliberation and reflection, I do not feel that I have acted unjustly and obtrusively in urging them upon the attention of others who may be able and willing to reduce them to practice, as I certainly should have done, had I not bestowed a due measure of thought upon the proposal I have made and the plan I have suggested. I have replied briefly, but I trust satisfactorily and conclusively, to the objections which have been urged against my proposal by one who is universally esteemed to be one of the most able and distinguished of British surgeons, and, if I have omitted to refer to the objections of one or two gentlemen who have thought it necessary to cavil at the operative proceeding I have advised, it is only because their remarks have so very manifestly betrayed that they have not adequately considered the subject they have, nevertheless, not hesitated to discuss, or rather, to determine.

---

* *Medical observations and inquiries*, Vol. iii. p. 135.

I should have been glad to have given the proposed method of curing fungus hæmatodes of the eye, without extirpation of the globe, the sanction resulting from its successful practice, but, it is extremely difficult to obtain an opportunity of performing the suggested operation in the provinces, where so many surgeons are adverse to the propriety of operating at all in such cases, and especially where it is necessary to operate, if my proposal is correctly acted upon, at a time when the disease appears to the friends of the patient, quite too unimportant to justify the adoption of the proper surgical proceedings. I should, of course, consider it to be wrong to attempt to remove the disease from the interior of the eye, when it had acquired much volume, but I do not think it would be at all improper, even if the nature of the disease were doubtful, to induce collapse of the eye-ball, by making an opening in the cornea and ascertaining the character of its contents; for, whatever may be the real nature of the affection, it necessarily involves the loss of vision, so that, as far as the use of the organ is concerned, the patient sustains no injury by undergoing the operation; and the adaptation of an artificial eye to the collapsed globe will render his personal appearance quite as agreeable as it would be if suffering from the querity occasioned by the peculiar and conspicuous colour of the pupil, with probably irregular bulgings of the slerotica, so generally associated with the continuance of the disease; and if the done since."* The patient from whom MR. MUDD removed an eye affected with fungoid disease, said, the day but one after the operation, "the pain bore no comparison with what he had felt for many months before the operation."† I have noticed that where, from various causes, the fungoid disease has occupied the orbit a few months after the removal of the eye, that the condition of suffering has been mild, compared with the state of agony other children have endured whose disease has been allowed to remain, without being interfered with by an operation. Perhaps this may be explained by the removal of tension, and of all impediment to the free growth of the fungùs.

Supposing that an eye, in which fungus hæmatodes existed, had been removed by operation, is it possible to adopt any treatment that will materially diminish the risk of a relapse—that will prevent the probable occurrence of the medullary affection in the orbit, in the opposite eye, and in any other part? I believe that the only measures to be adopted have for their direct object merely the improvement of the general health; and for this purpose we may recommend a mild nutritious diet, change of air, alterative doses of hydrargyrus cum creta, with the sulphate of quina, or sarsaparilla in some agreeable form. Cicuta was formerly a favourite remedy for this disease, and all complaints supposed to be cancerous, but I am not aware that it has ever done more than diminish the pain with which they are attended. In a case related by MR. HAYES, this remedy was carried to its utmost limits, and yet the disease progressed in the previously healthy eye just as it usually does, where the cicuta has not been administered.* A gentle course of mercury, combined with measures of management best calculated to improve the general health, are, as far as my observation extends, the best and only means of preventing a recurrence of the disease, when it has fixed upon, and confined itself to, a small and limited part of the body, which has been taken away by a surgical operation or by any other means.

---

* *London Medical and Physical Journal*, Vol. xi. p. 199.

† *Edinburgh Medical and Surgical Journal*, Vol. iii. p. 4.

As I have expressed an opinion that some cases of fungus hœmatodes depend on a certain altered condition of the blood, and that the deposition of the encephaloid matter is merely a means of relieving the vital fluid from its morbid imbuements, it may be supposed that in such instances at least, I should suggest a mode of treatment adapted to this view of the cause of the disease. But, in truth, I am unprepared to support my opinion by any approach to satisfactory evidence—it may indeed be mere conjecture; but, even presuming I could furnish decisive evidence of its truth, I should still be unable to point out those remedies, which, by changing that condition of the blood on which I have presumed the disease sometimes to depend, would furnish the most speedy and the most rational mode of cure. However, I do not think this conjecture, respecting an imperfectly understood, though highly important, part of pathology, unworthy the attention of those who have leisure and zeal to enter upon its investigation.

I subjoin the two following cases, for the particulars of which I am indebted to my friend MR. RUSSELL. The occurrence of the disease in two children (sisters) of the same family, is somewhat remarkable, and, as far as I know, has never been noticed before.

---

* "In a few days after the eye was extirpated, she was put by DR. BROKLESBY, under a course of the cicuta. She at first was ordered a single grain of the extract daily; and the dose was gradually, and with due circumspection, increased, during three months, till she came to bear at length sixty grains in a day very well, nor was it productive of any the least sensible inconvenience." *Med. Obs. and Inquiries*, Vol. iii.

Case iv.—" In reply to your enquiry as to two cases of malignant fungus of the eye-ball occurring in the same family under my care, I beg to state to you that the eldest child was born in July, 1832. It was a fine healthy little girl when born, but soon after birth it had an obstruction in its nostrils which greatly impeded its breathing; the interruption was at times so great as to cause apprehension in the mind of its nurse of convulsions. When she was about six months old, her mother observed a slight degree of squinting in one of her eyes, and in about two months after she perceived a glistening appearance in the same eye. The child was immediately taken to Mr. Hodgson, who, on examining the eye, observed an orange-coloured substance at the bottom of the eye-ball, this, however, could only be seen when the pupil was fully dilated by taking the child into a darkened room. It was about this time that I first saw the appearance in the child's eye. The nature of the disease was at once evident to both of us, and we were of opinion in consultation, that no operation should be recommended, knowing, from experience, that all operations in such cases are not only attended by intense suffering to the patient, but that hitherto they have failed in producing any beneficial result.* This opinion was afterwards confirmed by Mr. Travers and Mr. Lawrence, who saw the child in London. The disease remained in an inactive state for the first twelve months, our attention being principally directed to the preservation of the child's general health. In a short time afterwards, the disease assumed a much more active form, and the tumour rapidly increased. It soon burst through the confines of the eye-ball, and grew to nearly the size of an orange, discharging a thin offensive ichorous fluid. Very little hæmorrhage occurred in the progress of the disease. Distinct portions of the tumour sloughed which I removed from time to time with the scissors, and a considerable time before the death of my little patient, the whole of the original tumour sloughed away, leaving a deep hollow cavity. For a short time the tumour was much diminished in size, but, fresh fungus growth proceeding from the linings of the eye-lids, soon restored it to its original size. The wax-like appearance of the skin of the child, and the large superficial blue veins so peculiarly characteristic of this disease, were very strikingly apparent in this case. Growths of a similar kind were formed on both sides of the neck, and on the head of the child. My little patient gradually sunk under the exhausting drain its constitution had to endure, and the suffering necessarily attendant upon such a disease. Its extremities became œdematous and it died Feb. 26th, 1835."

---

* It will be evident from a perusal of the preceding observations, that I do not admit the accuracy of the opinion expressed by Mr. Russell, on behalf of himself and Mr. Hodgson, in reference to the invariable uselessness and impropriety of an operation.

Case v.—"The other case is the second child, a beautiful little girl, and in every other respect a perfectly healthy child. It was born in November, 1833. This child had the same obstruction in her breathing as her sister, but in a much slighter degree. Its mother's attention was first arrested by observing a slight degree of squinting in the left eye, but no appearance of disease was discovered till the early part of November, 1834, when, on bringing the child into a darkened room, and looking into the eye in one direction, I could distinctly perceive the same orange-coloured substance, which was observed in her sister's eye. In January, 1835, the iris was subjected to the influence of belladonna, and was seen at this time by Mr. Hodgson. The same opinion was given, both as regards the nature of the disease, and its treatment, as was given in the former case. The child was afterwards taken to London, and was placed under the care of Mr. Tyrrel. Small doses of the Hydrargyrus cum cretâ were given to it and have been persevered in to the present time. It is now (May, 1835,) more than three months since it has been subjected to this treatment; the child's health continues good, but the disease is evidently slowly advancing."

In the first of these cases, (which was not the subject of examination after death) it is remarked, that " growths of a similar kind (to that in the eye) were formed at both sides of the neck, and on the head of the child." I have often remarked these tumours, and have very carefully noticed their characters on post-mortem examination; and I regret that I am not, in the present case, in possession of any positive evidence to show that they were composed of the medullary matter similar to that which existed in the eye-ball. It is difficult to determine the matter quite positively during life, unless the skin ulcerates or sloughs, and exposes the part it formerly covered. When tumours exist beneath the scalp, in connexion with fungus hæmatodes of the eye, I have sometimes found that they have been composed of the true medullary matter, less frequently, they have appeared to be mere purulent deposits, or small abscesses, containing a thick, and yellow, and sometimes a slightly curdy pus. The same enlargements, when seated in front of the ear, by the side of the face and beneath the jaw, are usually nothing more than enlarged glands, in various stages of suppuration.

The two following cases occurred some years ago, and were related by me in the course of some "Observations on fungus hæmatodes of the eye," which were published in the *Medical Gazette.*[*]

CASE VI.—William FOREMAN, six months old, has several small slightly-elastic tumours beneath the scalp, unattended with cutaneous discolouration; considerable enlargement at the front and upper part of each temple and protrusion of each eye-ball. The child is generally drowsy, and becomes quite comatose when the temporal tumours are compressed. On examining the eyes, that on the left side appeared healthy, although evidently pushed forward by some substance behind it; the pupil of the right eye was exceedingly large, the iris inactive, and the crystalline lens slightly opaque, and pressed against the neural surface of the cornea by a yellow shining substance, of a rugged, uneven appearance; the sclerotica was generally of a dark-brown colour, and irregularly enlarged; the cornea attenuated, and so extended as to appear twice the size of that in the opposite organ. The mother says that her former children were quite healthy, and that the patient in question was also a fine strong child for many weeks after its birth; she does not remember that the infant has received any blow on the eye, but had remarked a peculiarity of appearance, as if something bright was in the eye, before it enlarged, and lông before the appearance of the swellings about the head; she further stated, that when four months old it had a fit in the night, and since that time has been getting gradually more drowsy, the eyes have been protruding, and the tumours of the scalp have been increasing in size, being prior to that period so small as almost to escape notice. In a few days the attenuated cornea gave way, allowing the evacuation of the lens (which was slightly diminished in size, and somewhat opaque,) and the protrusion of a soft red fungus, which occasionally bled. Although the patient's sufferings were by this means slightly relieved, the irritation and discharge, joined to the occasional hæmorrhage, quickly exhausted its vital energies.

---

[*] Volume vi. page 879.

*Inspectio cadaveris.*—On removing the scalp, several nodules of a medullary structure were observed, connected by cellular membrane to the pericranium; they were somewhat firmer than brain, and white and homogeneous throughout. Brain slightly congested, with an additional quantity of serum in each lateral ventricle; at the back of the orbit on each side, and covered by, or rather external to, the dura mater, was a reddish medullary mass, in some places of a deep red colour, surrounded by an irregularly-formed circle of a fainter appearance; the orbitar plate of the frontal bone was partially absorbed, and the remainder of it altered, as though partaking of the same morbid character as the surrounding parts. The bulk of the tumour in each orbit was about the size of a very small orange, connected by a transverse portion of the same diseased structure, which extended backwards, still covered by the dura mater (which was raised from the bones), as far as the anterior clinoid processes, and, on the right side, to the petrous portion of the temporal bone. I could discover no trace of the optic nerve of the right side, except where it was united to the sclerotica; it was at that point a soft and reddish mass, to the ocular extremity of which was a similar substance, slightly altered by incipient mortification. The sclerotic coat appeared healthy, but the major part of its contents had sloughed away a few days before; indeed no part of the eye-ball remained, with the exception of the ruptured and attenuated cornea; the sclerotica, in many places thin and sacculated; and the medullary and partially mortified mass attached to the extremity of the optic nerve.

*Chest.*—The heart, lungs, and pleura were healthy; many of the ribs on each side, as far as their cartilages, were red and swollen, and when cut into were found to be soft and pulpy, evidently approaching to the state of medullary change which has just been described as affecting the interior of the eye-ball and the bones of the orbit.

*Abdomen.*—Liver enlarged, and converted in many places into a medullary mass of a pale red colour; both kidneys had undergone the same kind of alteration, and were greatly enlarged; the mesenteric glands, although somewhat augmented in size, had not experienced much change of structure; the other viscera were moderately healthy.

I am not aware that there is any case upon record in which a distinct fungoid change had taken place in the ossific textures, not originally involved in the disease, by any means to the same extent, as in the preceeding example; and perhaps there are few recorded instances in which so great an amount of fungoid disease has occurred at so early a period of life.

CASE VII.—Edward EAVES, six months old, a fine healthy-looking child, was brought to the infirmary on account of a shining appearance of the right eye, which was first noticed by its parents (and referred, as in the former case, to the sun shining upon the eye) when the infant was two months old, but has lately been much more distinctly observed; has enjoyed good health generally, but for the last month has been somewhat peevish and irritable.

*Appearance of the eye.*—Iris pushed against the cornea by the lens, which has partially lost its transparency, through which is seen, deep in the eye-ball, an amber-coloured substance, which, when viewed laterally, has a remarkably brilliant appearance, and is traversed by a red vessel; the globe is irregularly enlarged, the pupil ample, the iris immoveable, and vision quite destroyed.

The disease was immediately recognised, and a palliative plan of treatment adopted. As it advanced, the child became subject to convulsions; the eye-ball increased in size so as scarcely to be covered by its lids, the vessels of which were enormously distended; the pupil enlarged to nearly the dimensions of the cornea, so that a portion of the lens might be seen when the eye was viewed laterally; the cornea became attenuated from the pressure of the lens upon its neural surface; and the sclerotica studded with bluish projections, some of which, at their apex, seemed likely to burst. At this time sickness and severe convulsive attacks supervened, and deprived the infant of life, eleven months from its birth, and five from my first observance of the disease.

The post-mortem examination was restricted to the removal and inspection of the morbid organ. The optic nerve was enlarged, softened, and in some places of a red colour; the sclerotica attenuated, and the cornea increased in its superficies and extremely thin in texture, as though it had been stretched, or beaten out between two hard substances; the choroid was in many places pale; no appearance of the retina could be discovered, except around the optic nerve, where a membrane, bearing an indistinct resemblance to it, was seen. No aqueous humor could be detected. The lens was a little diminished in size and transparency, and is contained within its capsule, which is enormously thickened; the anterior hemisphere of the capsule is in close contact with the cornea, its posterior hemisphere is pressed upon by the medullary growth, but is not in the slightest degree affected with the malignant disease;* the place of the vitreous humor was occupied by a reddish substance, of a firm consistence at its circumference, but nearly in a fluid state at its centre, a portion of which appeared to adhere to, or arise from, a part of the retina near to the optic nerve; this redness was not, however, uniformly diffused, but in some situations resembled a clot of blood, around which the colour was fainter as it receded from the centre, until it assumed a perfectly white appearance.

It will be noticed that no extensive evidence of a constitutional affection was present in this instance; that the choroid was rendered pale, and here and there absorbed; that neither the cornea, the sclerotica, the crystalline lens or its capsule, were at all affected with the medullary change; and that the retina was only to be distinguished around the pedicular origin or attachment of the fungoid growth.

This is a description of case in which it would be right to perform the operation described at page 428; but, it appears to me, that the operation would not have been suitable long after the time when the disease first came under my observation. Had any operation been practised, say a month before the child died, the extirpation of the globe would have been manifestly best adapted to the circumstances of the case.

---

* I have preserved the eye from which this description is furnished; it is divided in its antero-posterior diameter, so as to expose its interior very completely. The thickening of the capsule of the lens is remarkably distinct, and is greater than I ever remember to have noticed before; in fact, I scarcely ever saw so fine and delicate a serous membrane so greatly thickened. The distinction between the capsule and lens is very evident, not by any difference of colour, for they are both alike in that respect, but by a slight receding of the lens from its capsule, as though its texture had been a little more compacted by the spirit of wine than that of the capsule; there is also a very perceptible red mark, which indicates the boundary line between the contained and the containing parts. The irregularly red and white colour of the medullary mass are very well preserved, as well as the separation of the fungoid growth from every part of the containing membrane, except at its junction with, or attachment to, the retina, near the optic nerve.

## SECTION III.—MELANOSIS OF THE EYE-BALL.*

*Definition.*—The term melanosis is applied to the development of a dark-coloured, and generally, intensely black substance, in certain parts or organs of the human body, in which a dark-coloured secretion or substance does not naturally exist at all, or exist only in very minute quantities. I have thought it necessary to give this rather prolonged definition, because it is as yet a matter of doubt whether or not the disease termed melanosis, may not, under certain circumstances, be nothing more than a mere increase, with probably a slight perversion of the pigment or secretion which is occasionally found in certain parts of the body, in some of the natives of hot climates, and also in certain animals.

*General observations on melanosis.*—It is on account of this very prominent character of blackness, that the malady we are investigating first received, and has since retained, the name of melanosis; but, we have unequivocal examples of melanosis without positive blackness, for sometimes the morbid secretion is merely of a very deep yellow, or a light brown colour, and again, its colour like its consistence will sometimes vary at different periods of its existence, and even in different parts of the same diseased mass. MR. COOPER says, "the colour of melanosis varies from dark yellow to brown, deep blue approaching to black, and to complete black, which is the most common."* And, on account of these varieties in colour, BRESCHET objects to the term melanosis, as an unfit general designation. "Ce mot (mélanose)" says he "n'exprime que la couleur de ces matières, et cette désignation ne se trouve ni très rigoureuse ni très-exacte, car on voit plus souvent ces matières êtres jaunes-brunes, couleur de suie ou de bistre, que véritablement noires. Cependant j'en ai rencontré, qui étaient parfaitement noires, et qui coloraient les tissus de lin et le papier, comme le fait la solution aqueuse de l'encre de la Chine."† However, there are several varieties (I can hardly call them species) of melanosis, the most frequent of which is characterized by the most intense blackness, so that the name to which BRESCHET so much objects, is still indicative of one of its most general and most perspicuous characters. MR. COOPER speaks of four forms of melanosis,‡ and ANDRAL observes, that "melanosis may exist in four forms; 1, it pretty frequently constitutes masses encysted or otherwise;—2, the matter which composes it, may, like the tubercular matter, be infiltrated into the different tissues;—3, it may be spread like a layer of greater or lesser thickness on the free surface of the membranous organs;—4, lastly, it may exist in the fluid state, either pure or mixed with other fluids."* Such are the perspicuously arranged opinions of Andral, and I believe no better writer than he, upon melanosis, has yet appeared. Long after the appearance of Laënnec's remarks upon melanosis, many English surgeons did not appear to make any distinction between it and fungus hæmotodes, among whom I may mention Wardrop and Travers. Mr. Travers, indeed, in summing up his opinions relative to fungus hæmatodes of the eye, makes use of the following words, "so also the colour distinguishes the share which the choroid takes, by the profuse morbid secretion of pigment;"† forgetting, as it would appear, that the disease occurs in other parts of the body, where no choroid pigment exists.

---

* Melanosis has not, until a comparatively recent period, received much attention. It was first described by the celebrated Laennec, in 1806, under the designation it now retains. Soon afterwards M. Bayle published upon the same subject; and in 1821, Breschet wrote some valuable remarks upon this singular disease, in which he claims for Dupuytren, the honour of having described melanosis very fully in his Lectures, several years before the appearance of Laennec's researches in the *Bulletins de la societé de l'ecole de medecine for* 1806. In the year 1824, Messrs. Cullen and Carswell published some valuable observations upon this interesting subject in the *Edinburgh medical and surgical journal;* and two years afterwards there appeared an excellent monograph upon this affection, from the pen of Mr. Fawdington. Since that period the authors of observations upon melanosis have been exceedingly numerous.

---

* See note to *his first* edition of GOOD's *Study of Medicine*, Vol. iii. page 331.

† See his paper entitled "Considérations sur une altération organique, appelée dégénérescence noire, mélanose, cancer mélané, &c." published in the first volume of MAGENDIE's *Journal de physiologie.*

‡ GOOD's *Study of Medicine*, Vol. iii. p. 331.

*Colour.*—The colour of melanosis varies; it may be of a deep yellow tinge; of a pale blue; or, of a more or less deep brown colour; and, finally, it may possess an intensely black colour, which may either be of a dull, or glossy appearance, and, this last is by far the most common variety.

*Consistence.*—The consistence of melanotic deposition varies; it may be composed of a fluid of a uniform density, or of a solid tenacious substance, and when deposited in masses, answering to Good's description of "melanosis tuberculare," it may be more dense on its surface than in its centre; and further, when deposited, it may be solid, and become liquid afterwards, or undergo a process of ramollissement, as Laënnec, Béclard, and Trousseau have stated. Undoubtedly the melanotic matter undergoes various changes in its degree of consistence, not only in different parts of its substance, but at different periods of its existence;—it may be equally and uniformly consistent at the time of its deposition, or even at that period its centre may be softer than its surface, or the reverse of this may take place, or this difference of consistence may occur after the melanotic matter has been deposited; and various reasons have been assigned for these changes, which I shall not now stop to detail.

---

* See his *Treatise on Pathological Anatomy*, translated by Townsend and West, Vol. i. p. 549.

† *A synopsis of the diseases of the eye.* Third edition, page 431.

*Organization.*—Those who ally this disease with fungus hæmatodes, of course believe that its structure possesses vascularity, and MR. LAWRENCE, who considers that fungus hæmatodes and melanosis are the same in nature, observes that melanosis appears to be a vascular substance, and remarks, whilst displaying a preparation to his class, "this is a specimen of melanosis which is, in fact, in the stage of progressive conversion into the black condition. You observe a white and medullary substance in one part, whilst it is beginning to be black in another." We can only understand by the term progressive conversion, as used by MR. LAWRENCE, that he believes the melanoid affection to be originally and essentially the same as fungus hæmatodes. BRESCHET was at great pains to ascertain whether or not the melanotic matter was organized, but although he could inject the cist in which it was contained, he was quite unable to trace any continuity of vessels from the one to the other. I believe this matter is now decided in the negative, and am satisfied that any one who has an opportunity of dissecting an eye affected with melanosis, or of injecting the eye of an animal which, at the time of its death, laboured under this disease, will concur in this opinion. We can inject the cist, or cists, containing the melanotic matter, or we may generally inject the texture in which it is deposited, but we cannot make the injection pass into any vessels which can with propriety be said to constitute the nutrient or organizing tubes of the melanotic deposition itself.

*Textures in which melanosis originates.*—We have no reason to believe that any texture of the body is actually converted into the matter of melanosis, on the contrary, every fact connected with the history of melanosis appears to favour the idea, that it consists of a mere inorganic and nearly innocuous secretion, which immediately proceeds from deranged capillary action—a peculiarly altered or diseased state of the secernents of a part—and that, wherever it may occur, it is either superadded to natural structures, augmenting their volume, is isolated by the formation of a distinct cist around it, or, when not attended with an increase of bulk, has produced, by its pressure or the irritation it has excited, the absorption of those parts which once occupied its situation, or existed in its neighbourhood. It has been said that melanosis consists in a diseased modification of the adipose secretion, but, although this statement derives some support from many circumstances connected with its history, there are a great variety of facts which militate against its accuracy, and among others, the occurrence of the disease in the eye—in a part where no adipose secretion is naturally produced.* There are many facts which would render it probable that the disease originates in cellular membrane, and they are chiefly derived from an attentive dissection of the morbid structure itself, and a knowledge of its usual seat. We generally find that when, for instance, a serous membrane appears to be the seat of melanosis, the morbid deposition is situated beneath or upon it—it is not deposited within its texture—and in every instance, except one, related by TROUSSEAU and LEBLANC, the muscular structure has been free from the disease, even though, on cursory inspection, it might seem to be extensively involved in this morbid condition.* I have several times seen spots of melanotic matter in, apparently, the muscular substance of the heart, but, in every such instance, where the examination has been closely pursued, I have found that the black deposits which appeared on first view to be so placed, were situated in, and attached to, the cellular membrane which connected the fasciculi of the muscle together. There is an excellent account of the comparative rate of frequency, with which the various parts (I do not now refer to the primitive organic tissues) of the body are affected with melanosis, in ANDRAL'S work on *Pathological Anatomy.*† This indefatigable pathologist remarks that the fibrous membranes, and cartilages, and also nerves, are never affected with melanosis; but I do not coincide in this statement, for I have myself put up two specimens of this disease in the eye, in which the sclerotica was, prior to the removal of the affected organ, very distincly discoloured;‡ and the optic nerve, as well as the brain, were, in two instances very extensively and unequivocally affected; but it has not fallen under my observation to see the cartilaginous textures so diseased.

---

* The disease is, however, sometimes developed in the orbital adipose substance; such a case occurred in the practice of Dr. Hunter (*Lancet*, Vol. xiii.), and, in a case related by Messrs. Cullen and Carswell, it is stated that "there was a considerable mass of black matter lodged posteriorly to the globe, and deep in the orbit, apparently in the fat and cellular tissue surrounding the optic nerve."—*Transactions of the medico-chirurgical society of Edinburgh*, Vol. i. p. 274.

---

* "When we examined the orbit after death, we observed that the disease had been reproduced in its old situation, and at the expense of the cellular tissue; for the muscles and nerves, so far as we could trace them, had undergone no alteration." CULLEN and CARSWELL, in op. cit.

† The same subject is also fully discussed by BRESCHET, in MAGENDIE'S *Journal de physiologie expérimentale.*

‡ The texture of the sclerotica was the seat of a certain quantity of melanotic deposition, so that the tinge it acquired was not occasioned by the mere attenuation it had undergone from the pressure of the black matter it contained, by reason of which the colour of its contents was rendered manifest.

It is remarked by CRUVEILHIER and BRESCHET, that sometimes a black matter, or a more or less fluid melanotic matter, has been found in the cavity of small arterial and venous vessels; this black matter has been said by them to exist in the interior of the vessels, and to consist of globules, which are capable of being displaced by pressure. Recent observation has established the accuracy of this highly important fact.

The crystalline lens appears to obtain an exemption from melanosis, at least, I have never yet seen it so affected; it has been, in some cases of melanosis oculi, of a deep yellow colour, but it has never assumed a dark brown or black colour, even in those cases where, from the slowness with which the disease has advanced, it has not been discharged by sloughing or ulceration of the cornea, or only partially removed by absorption, until a very late stage of the affection. In those instances in which it has been said to have acquired a black colour (cataracta nigra), it has been represented to be the only part of the eye which has been so altered; it has led to no serious or alarming symptoms; it has neither become softened or flocculent; and has partaken of no character of the melanotic affection, with the exception of its black appearance.

I have never had an opportunity of dissecting an eye affected with melanosis at a very early stage of its existence, so as to be enabled to make out, by careful dissection, the various parts and membranes with which it is at that stage connected by intermixture, contact, or contiguity, and the relation which the morbid growth bears to them; for it does not destroy life at an early period of its existence, and when it has continued for some time, the various parts of the eye become so confused, intermixed and blended, and others become either totally or partially absorbed, that it is actually impossible to decide at all correctly, under such circumstances, in what structure the disease commenced. However, when we have an opportunity of examining a case of this kind, just prior to the rupture of the cornea, we observe that the vitreous humor is absorbed, and that in its stead, there is a black pultaceous mass, which will vary as to its degree of consistence; and it may be contained in a simple cavity covered or otherwise, (according to its degree of advancement, and the effect of that progress on surrounding parts,) by the retina and the choroid on one side, and the sclerotica on the other;* in other instances, the fluid may be contained in several cavities, or it may be confined in two larger divisions or compartments. I have seen the melanotic matter contained within the cavity of the eye, and occupying the situation previously occupied by the vitreous humor; more generally it is deposited between the retina and the choroid, or between the latter membrane and the sclerotica. When the retina is pushed before the melanotic deposition, it may either be absorbed or torn: these effects are usually determined by the speed with which the deposition occurs. I have explained that the retina may or may not be present, but it is very seldom that it can be found in its natural state—it is usually absorbed and lost in, or confounded with, surrounding parts; the choroid is more readily distinguished, and is less frequently absorbed; and the sclerotica is usually attenuated, either wholly or partially, and has acquired a brownish or cerulean tint, and the eye-ball is also at this stage a good deal enlarged. The iris, if present, is in contact with the neural surface of the cornea, or, it may be more or less extensively absorbed, and the lens may, or may not be absorbed, but, if present, it will be displaced, and will be forcing the iris against the cornea—its neural aspect being in contact with the melanoid production. Hitherto the structural changes wrought in the cornea are by no means considerable, it will be cloudy and somewhat extenuated. But as the disease advances, either the sclerotica will rupture, and the melanoid growth will protrude externally, or, if the sclerotic conjunctiva remains entire, it will give it a mucous covering, or the cornea will give way, and it is by this means that the melanoid tumour is generally enabled to escape from its confinement; and this rupture of the cornea may be effected in various ways, it may either be mechanically torn after having become attenuated, or it may ulcerate, or it may slough. Of course, when the tumour has once protruded, it may continue to increase, and it is just possible that a natural cure may be effected by the sloughing and mortification of the parts into which the melanoid matter is deposited or secreted. It might be expected that a disease of this description would be very likely to affect the absorbent glands in the neighbourhood of the eye; but I have not remarked this occurrence myself, in any one case, and Mr. Lawrence states, that he has not met with any instance, in which the absorbent glands were affected from a participation in the disease; but on the other hand, Andral, Good, Elliotson and Cooper, conceive that the lymphatic glands are singularly obnoxious to its action. And with regard to the optic nerve and the brain, they are very liable to this morbid change, and, in some cases, it is almost doubtful whether they, or the eye, were the parts first affected; and, it is no unusual thing to find similar morbid changes in various parts of the same body.[*] Sometimes the disease will not actually affect the globe of the eye, but will exist in the orbit, in, very probably, the orbital cellular membrane, and is first suspected by producing proptosis; for, when it has acquired a certain size, it urges the eye-ball forwards, and very frequently projects the conjunctiva, through which it is seen as a small dark-coloured tubercle.[†] An instance of what I believe to have been melanosis, is mentioned by Mr. Travers,[‡] in which the disease appeared to originate in the interlamellar cellular membrane of the cornea. Mr. Travers removed the tumour, which appeared like a bunch of currants, and he states, that the patient perfectly recovered. However, these must be considered as exceptions to the general rule, for without doubt, the disease arises much more frequently in the posterior part of the eye-ball, than either upon its suface, or in the cellular tissue behind it.

---

* "This is the proper place for noticing the appearances found in the eye, at the time it was operated on. The situation of the vitreous humour was completely occupied by a black looking fibrous mass, pushing the choroid coat and the retina into the posterior chamber. These tunics had undergone no sort of alteration, and the sclerotica was every where entire." CULLEN, and CARSWELL, in *Transactions of the medico-chirurgical society of Edinburgh*, Vol. i. p. 274.

*Chemical analysis.*—The various analyses of melanotic deposition, have demonstrated that it consists of, or at least contains, many of the constituents of the blood, and I have already explained that both Cruveilhier and Breschet have discovered black globules in the interior of the minute vessels in the neighbourhood of parts affected with melanosis; but one of the most recent, and at the same time, elaborate and accurate analyses, which has been accomplished, is that conducted by M. Foy.[*] Numerous analyses have made been by various scientific individuals, and they all agree in stating that the dark colouring matter, of which the diseased production appears mainly to consist, bears a certain resemblance to the colouring matter and other constituents of the blood.

---

[*] On post-mortem examination of a person, (Mr. Armitage) whose eye had been removed by Mr. Hodgson, on account of melanosis, about a year prior to his death, the lungs, the pericardium, the liver, the intestines, the kidneys, and nearly every important organ in the body were more or less extensively spotted with the melanoid deposition.

[†] A case of this kind is related by Dr. Hunter, another by Mr. Syme, and a third by Chomel.

[‡] *Synopsis of the diseases of the eye.* page 102.

The chemical analysis of the matter of melanosis has suggested to my mind certain views respecting the etiology of the disease and its treatment, which I hope to have an early opportunity of reducing to practice. Aware of the effect of acids in darkening the colour of the blood, I have thought that the preternaturally large quantity of acid contained in the blood of some individuals, may be the essential cause of the affection termed melanosis, and that the black deposition, which constitutes the disease, may be a means of freeing the vital fluid from its morbid imbuements. If this view of the subject were correct, it would be manifestly proper to administer the neutral salts very freely, and if their internal administration were insuffi-

---

[*] The melanoid matter, from which the following results were obtained by M. Foy, was taken from a horse:—

| | |
|---|---|
| Albumen | 15. 00 |
| Fibrine | 6. 25 |
| A highly carbonized principle, probably altered crassamentum | 31. 40 |
| Water | 18. 75 |
| Oxide of iron | 1. 75 |
| Subphosphate of lime | 8. 75 |
| Muriate of potash | 5. 00 |
| Muriate of soda | 3. 75 |
| Carbonate of soda | 2. 50 |
| Carbonate of lime | 3. 75 |
| Carbonate of magnesia | 1. 75 |
| Tartrate of soda | 1. 75 |
| | 100. 00 |

cient to produce effectual relief, might it not be justifiable to bring them directly in contact with the blood by means of injection?* If we examine the border of the penetrated parts of a stomach which has been perforated by the agency of the gastric juice after death, we find that the blood in their neighbourhood is very dark coloured, and, if a small quantity of blood has been effused beneath its mucous coat, so that the gastric juice can obtain access to it, we also find that the effused blood is rendered black, and the appearance produced will closely resemble that occasioned by a deposition of melanic matter. Certainly, cursory examination would not enable us to distinguish any difference between a spot of melanotic deposition, and the dark coloured blood effused beneath the mucous membrane of the stomach, and acted upon by the gastric juice.

Melanotic matter has no peculiar smell or taste, it tinges light coloured paper of a dark brown colour, and is dissolved by, and discolours water, but becomes fixed in the part in which it was originally deposited, by spirits of wine.

*Appearances produced by melanosis of the eye-ball.*—The early symptoms of melanosis of the eye-ball are evinced by the appearance of the eye, and the condition of vision, for it does not excite attention by causing much local pain or by inducing much constitutional disturbance. The sight is generally from the first seriously impaired, or quite destroyed, the iris convex anteriorly, the lens and humors of the eye slightly cloudy, the pupil dilated, and, on looking towards the bottom of the eye, there will appear to be a dull dark slate-coloured body situated deeply within it. Hitherto there is not necessarily present any material uneasiness, either of a local or general character, nor is there much, perhaps not any, superficial redness. As the disease advances the symptoms put on a more serious aspect, for then the posterior chamber is filled with the melanoid mass, the lens is dislocated, the iris compressed, and all those symptoms are produced, which tension of the globe, from whatever cause arising, would be likely to excite. If the disease continues, and the patient is not destroyed by the extension of the disease in other parts, (and particularly in the brain,) the cornea, or sclerotica, will either give way, or otherwise it may be necessary to make an opening into the eye-ball, to relieve the intolerable anguish which sometimes results from the confinement of the melanoid growth. Before the external tunics give way, the nature of the disease is rendered evident, by the black dingy mass behind the lens, and generally, also, by a peculiar dark-brown appearance of the sclerotica. I do not deem it necessary to pursue this part of my subject further, for the symptoms which may arise, when the melanoid mass is protruded through the external tunics, will be modified by so many circumstances which are not peculiar to this disease, but which accompany various other local sources of irritation arising from other causes, that I cannot pretend to mention them in detail. The disease may become very extensive, and may involve nearly all the parts in its neighbourhood, not excepting the osseous texture; and the constitutional irritation will be more or less considerable, according to the natural constitutional susceptibility of the patient, the existence, or otherwise, of the disease in other parts, and a great variety of other circumstances, which it is not necessary for me to mention more particularly. When the melanotic

---

* If any surgeon has an opportunity of seeing and treating an animal affected with melanosis only in a slight degree, I would suggest the propriety of his endeavouring to test the effect of the following measures:—About once a week, open a vein in some convenient situation, and remove, according to the size of the animal, several ounces of blood, and afterwards inject an equal quantity of water holding in solution a little of the carbonate and the muriate of soda.

eposition protrudes externally, hæmorrhage may arise,
there may be a discharge of a black fluid, and
ortions of the melanotic matter may be occasionally
etached; and the hæmorrhage very generally succeeds
me form of local injury, such as bruising or lacerating
e part. Now, of course, as the melanoid substance
inorganic, the hæmorrhage cannot proceed from it;
fact it takes place from the part which is engaged in
creting the black matter—the vessels, not ramifying
rough its substance, but upon, or near to the surfaces
pon which the melanoid matter is deposited, or within
hich it is enclosed; and, as regards the detachment of
rtions of it, we ought not, of course, to confound the
lling off of an inorganic substance, with that process,
means of which a slough is separated from vital parts
-from what were once its own vital connexions. I ought
observe, that pain is not a necessary attendant on mela-
sis, for the deposition, being inorganic, possesses in
elf no sensibility. When the disease occurs in the eye,
e chief part of the suffering arises from the confinement
the morbid secretion, and, as far as the mere circum-
ance of pain is concerned, there is no symptom peculiar
melanosis; but, when it takes place in other parts, it
oes not, necessarily, give rise to any material uneasiness
-but I cannot do better than quote, upon this subject,
e remarks of ANDRAL. He says, "the symptoms to
hich melanosis gives rise, have nothing peculiar about
em. They appear to depend;—1, on the chronic irri-
tion which so often accompanies it, whether as cause or
fect;—2, on the simultaneous existence of other acci-
ental productions;—3, on the uneasiness mechanically
roduced by its presence in more or less voluminous
asses, from its compressing, like any foreign body, the
arenchyma of the organ in which it is developed. When

none of these three circumstances occurs, melanosis may arise, and become developed in a tissue, without its existence being revealed by any symptom, any morbid phenomenon, local or general."*

*Causes.*—I do not know that we are in possession of any facts, which enable us to give any positively correct exposition of the causes of melanosis of the eye. In a few instances it has appeared to follow a blow, or some form of local injury, but independently of this presumed occasional exciting cause, I believe we have hitherto been quite at a loss to explain its remote or its exciting causes. I have remarked that in persons suffering from melanosis, there is an exceedingly acid state of the blood, and that this condition of the vital fluid, may constitute the cause of the malady, as we subsequently notice it, and I may observe in additional evidence of the probable correctness of my views, that the disease often prevails in many parts of the body at the same time; that melanic matter in a state of fluidity is sometimes observed in the small blood-vessels in the neighbourhood of a large mass of the disease; and that those who suffer from it very extensively, sometimes discharge from the stomach, the bowels, and the bladder, a chocolate brown fluid, much resembling the matter of melanosis..

*Diagnosis.*—I shall not stop to enter upon this part of my subject at all minutely, for I know of no disease of the eye, with which melanosis can be confounded, but I will very briefly contrast its most prominent characters with those of another malignant affection of the eye—fungus hæmatodes. In the first place, with regard to local symptoms, melanosis occasions less pain, and does not yield that appearance of deep-seated shining opacity

---

* *Treatise on pathological anatomy*, Vol. i. p. 582.—ANDRAL's opinions strictly accord with those previously expressed by BRESCHET.

is noticed in fungus hæmatodes; and besides its
is less rapid, and the general appearance of the
nance is more healthy,* and, what is very important,
r happens in early life,† whereas true fungus hæ-
s of the eye-ball is almost (perhaps quite) exclu-
confined to the period of infancy. In the latter
e, the sclerotica is either unchanged in colour, or
es slightly blue or brown, from mere attenuation;
melanosis, it often acquires a peculiar dark brown
and that too sometimes at an early stage of the
e. Of course, the differences on post-mortem
nation, are too numerous and distinct to render any
tion of them at all necessary. There is a deposition
k matter, which sometimes occurs in the lungs of
rsons, and particularly after an attack of chronic
itis, which Laënnec terms "black pulmonary
;" and it is sometimes noticed in hard [illegible].
er instances it exists in patches, the affected portion
pulmonic texture being somewhat indurated, but
ndered quite impervious; and lastly, the bronchial
s are occasionally converted into this firm black
nce; but these dark coloured depositions must not
nfounded with melanosis, for they do not possess its
ncy to spread, and to destroy life, nor are they found
er parts of the body, except in extremely rare in-
es.

---

La mélanose est, beaucoup plus que les autres tissus morbides,
tible avec l'état de santé." *Additions à l'anatomie générale de*
Bichat, par P. A. Béclard.
patient from whom Mr. Guthrie removed an eye affected with
osis, was 65 years old. (*Lancet*, Vol. xiv. p. 411.)—A similar
ion was performed for the cure of a like disease, by Mr. [illegible],
a patient 46 years old. (*Ib.* Vol. xv. p. 729.)—Dr. Home
ated a melanotic eye, for a person 51 years of age. (*Transactions*
*Medico-chirurgical society of Edinburgh*, p, 211.) Of the eight
of melanosis of the eye, related by Mr. Lawrence. (*A Treatise*
636)the youngest was 30, and the oldest 65.

*Prognosis.*—Of course, the prognosis would be very unfavourable, although less so than in fungus hæmatodes of the same part; and many cases are related where the removal of the eye, when affected with fungus hæmatodes, has been succeeded by permanent recovery. It certainly does appear to possess great malignity of character, it is very frequently fatal, and, with a knowledge that it so often exists in many parts of the body at the same time, and that when such affection of the constitution does take place, it is not always indicated in any decisive manner prior to the removal of the diseased eye by operation, it is our duty to give such an opinion respecting the probable termination of the case, as will prepare the minds of friend's for the most untoward result. Like all other malignant diseases, removal by operation is more likely to be advantageous if accomplished at an early, than at a late, period of the existence of the malady. If the case has been neglected, or if, from any cause, the operation has been delayed until the disease has become very large, it would even then be adviseable to remove the affected organ, always provided that there exist no decided symptoms of the disease in other parts of the body.

*Treatment.*—I have already stated, that the early performance of an operation, has been considered to afford the only rational chance of saving the life of a patient afflicted with melanosis oculi; and that no measures short of this are likely to exert any materially salutary influence upon this morbid affection. But particular circumstances may occur in connexion with this terrific malady, which may require the aid of medicine; for instance, the constitution may be rendered excessively irritable, there may be great local pain, (although that is not *necessarily* present at an early stage of the affection, nor indeed at any stage of it) and a great variety of derangements may exist, which it may be necessary to relieve, or remove, before proceeding to the extirpation of the diseased eye. In performing this operation, it will be right to bear in mind the circumstances which were mentioned when speaking of the extirpation of the fungoid eye—the lachrymal gland must be removed, and every portion of discoloured and indurated matter which the orbit contains.

It is not necessary for me again to point out what will most quickly and effectually relieve local pain, tranquillize constitutional irritability, and correct, or remove, those various derangements which are so apt to supervene on the existence of any malignant affection;—we have, in fact, to sooth local pain, quiet irritability, and tranquillize constitutional disturbance, when they arise in conjunction with, or, in consequence of melanosis, just in the same way as though similar derangement were associated with any of the other malignant affections of the eye.

It may happen that the patient will not submit to an operation at that period when it is advised with a rational chance of being succeeded by a successful result, but a long period of suffering may induce him to solicit the performance of an operation when the advanced stage of the disease renders it most improbable that it will be followed by any benefit, and, of course, under such circumstances, no prudent surgeon would operate at his own urgent suggestion, but recommend merely those anodyne applications, and narcotic medicines, which the degree of suffering may appear to demand.

There is one important question connected with the treatment of melanosis, which is intimately associated with its pathology; I mean, the nature of the process by the agency of which the morbid deposition is produced, and the nature of the morbid product itself. However, whatever may be the train of reasoning we may adopt, whatever view we may take, we are, in the present state of our knowledge, compelled to admit that nothing short of operation has hitherto been productive of any material benefit. Depletion, and the administration of mercury to the production of ptyalism, were ineffectually practised in an extremely well marked case of melanosis—a case perfectly favourable for the employment of any new method of treatment—by MR. WILSON, of Manchester,* and, in my own practice, iodine, mercury, quinine, sarsaparilla, opium, and various other medicines have been proved to be quite unavailing. If I have derived any benefit from any method of treatment, it has been from the adoption of the following measures, (excepting, of course, a surgical operation) and certainly in the cases in which they were used, the disease was either unusually slow in its course, or was rendered tardy by the use of the means I am about to detail. I directed the application of six leeches near to the eye, once every week, prescribed five grains of blue pill, and four of the extract of conium, to be taken every evening at bed time, and directed the patient to drink during the day a pint of the compound decoction of sarsaparilla. The other plan of treatment I have to recommend is one of the merits of which I have as yet had but an exceedingly limited experience; and it consists mainly in the free administration of the carbonate of soda, or some other neutral salt; and it will be perceived that this treatment is founded on my views respecting the essential cause of the disease—namely, a preternaturally acid state of the blood. I will now only slightly extend my remarks, by adverting to the circumstances which would induce a surgeon to recommend, and those which would cause him not to advise, the performance of an operation. If the disease had not yet ruptured the external tunics of the eye, or had merely protruded to a very slight extent, if the general health and strength were tolerably good, if there were no outward indication of the disease in any other situation, and no evidence of the implication of other organs, then, we might, with perfect propriety, advise the extirpation of the diseased eye; but, if the disease had been of longer duration, if it had protruded externally to any very considerable extent, if the health were seriously deranged, the strength much impaired, if other external signs of the disease were present in one or more situations, or if, from existing circumstances, there was reason to believe that the same disease was present in other parts or organs, then it appears to me that it would cease to be our duty to recommend—at all urgently to advise—the extirpation of the eye. After an operation of this description has been performed, it would be right to adopt every means calculated to improve the health, increase the strength, and enliven the spirits; the use of mild tonics, with a properly regulated diet, moderate exercise, change of air and scene, and so on, would be advisable.

---

* FAWDINGTON on *Melanosis*, page v.

### SECTION IV.—ANOMALOUS FORMS OF DISEASE OF THE EYE-BALL, BEING OF, OR RESEMBLING AFFECTIONS OF, A MALIGNANT NATURE.

I have met with many forms of disease of the eye-ball (some of which have eventually been cured, but by far the greater part of which have terminated fatally, which did not possess any characters sufficiently well-marked and unmixed to justify me in placing them among, either the scirrhus, the hæmatoid, or the melanoid affections of the eye; and, in perusing the works of the older writers many such instances will be found, and, as they had adopted no proper or systematic arrangement of the malignant diseases of the eye-ball, and could have had, therefore, no desire to make the maladies they saw correspond to any given type, their descriptions are still of great value. I am, of course, only alluding to those authors who, (by whatever name they might designate them) described such diseases, just as they were presented to their notice, stating their anatomical and other characters, and giving, in short, a correct description of what they *saw*; for, it cannot be imagined, that in presenting their readers with the description of a morbid product, they could be much less accurate than succeeding writers, in reference to their account of its anatomical qualities; and, unless this circumstance be attended to, when referring to ancient writers, we are very liable to be misled by misapplied names; for example, HEISTER, a great surgical writer, and an author of the highest authority, at the time he published his large work on surgery, gives a representation of what he terms an "oculus scirrhosus" and immediately adds, "atque ad ovi gallinacei magnitudinem expansus."* The next figure in the same plate is thus referred to by that distinguished surgeon:—"Fig. 15. gravissimum aliquem oculi sinistri fungum, selibræ pondus æquantem, representat. Utrumque tumorem istum egomet An. 1721. extirpavi atque curavi." So that, if this statement be correct, he is describing a fungoid affection of the eye, such as we are now considering, which was successfully removed. I have stated that tumours of various kinds, but of a malignant character, may arise in the eye, and that they cannot be properly arranged under any correct description of either of the three important maladies, previously mentioned, although they may partake more or less of the characters of one or other of them:—for instance, we may have occasion to see a disease of this description, some part of which shall pretty accurately correspond to fungus hæmatodes; another portion may, more nearly resemble melanoid production; and, in another part, we may have either a firm sarcomatons, a cartilaginous, a bony, and lastly, a fluid substance; and in nearly every instance of this description, this intermixture of morbid structure, or this blending of diseased growths, is occasioned by a process of inflammation, or, by some changed action in the vessels (presuming it to be organized) of the primitive disease—that part of the existing disease which constituted the primary deviation from the healthy structure. We find that this mixture of morbid structure or diseased production, most frequently occurs in those diseased parts which possess organization, and especially so, when that organization is considerable, but, in diseased structures which are lowly organized, such for instance, as osseous and cartilaginous productions, this blending or combination of structure is comparatively rare. It will be remembered that I am now referring to changes, occurring in those diseased productions which strictly constitute the primary deviation from the perfect and absolute integrity of a part. When the union of morbid productions occurs in those tumours which do not possess organization, of course, the additional diseased product or products, are referable to the action of those vessels which ramify upon the surface, or in the neighbourhood of those textures, into, or upon, or around which, the primary diseased product was deposited. Again, diseased productions may be engrafted upon each other; for instance, a deranged and peculiar action of a certain set or series of vessels may originate a cartilaginous growth, an action primarily perverted, and which has undergone a definite and precise kind and degree of perversion, may undergo a second perversion, a modification of the first, and may then deposit bone; and these new depositions or growths may both arise from a degenerate action of the primarily faulty part, or they may take place from certain derangements of the vascular actions of the new product itself. Undoubtedly, many of the modifications of diseased growths, and much of that combination or intermixture which sometimes exists in morbid productions, are referable, not to any change in the vessels of the part which gave rise to the morbid product, independently of that which permitted the primitive indication of such deranged or perverted action, but to a modified or deranged action of those vessels which constitute the organizing medium of the primary diseased production.

---

* Explanation of Fig. xiv, Tab. xviii.

I have alluded to the agency of inflammation, in producing a modification in the anatomical and other characters of a morbid growth, and we cannot fail to have noticed how strongly this circumstance is evinced in those instances where a diseased growth arises from the infliction of local injury, or, having arisen from such a cause, is modified in its characters and history by the application of external violence. In the specimen of fungus hæmatodes, recently described, it was stated that a clot of blood existed in the midst of the white medullary structure, and unless well acquainted with, and carefully bearing in mind this fact (the occasional effusion of blood in morbid structure), so great is the change it causes in the appearance of the disease, that a surgeon might be tempted to refer it to some admixture of disease—a secondary and supervening malady. With regard to the effusion of blood within the texture of a morbid product, it will either exist as a dense clot, or, if the texture of the part in which it is effused be loose, porous, and permeable, it may be extensively scattered, and merely yield a slight reddish tinge; and, when it occurs in a well organized diseased texture, it will very likely become absorbed, and will yield a different appearance, in accordance with the progress of the absorbent process; but when it happens to become effused within a diseased production which is not organized, then it will either become blended with, or diffused among it, according to the characters of the deposit in which it is placed, or it may remain as a dense coagulum, and in each of these cases it will be obnoxious to those laws which influence the removal of the diseased production itself.*

In endeavouring to attract notice to the various facts contained in the foregoing remarks—and chiefly to the circumstances, that, 1, diseased productions, of different kinds may exist in the same part; 2, that such united and anomalous diseases may depend on a great variety of causes, the chief of which are, inflammation, and changes in the action of the organizing vessels of the newly-formed mass; and lastly, that appearances of change may exist and ought to be distinguished from real differences;—I have been chiefly influenced by their very great importance, and the little attention which is too generally paid to them; and yet it is highly necessary that such distinction should be made, for, the general result of operations undertaken for the cure of, what I shall term, these mixed morbid productions, is much more favourable than in those instances where disease preserves the perfect purity of its type.

---

* I am not desirous of describing the circumstances connected with the effusion and absorption of blood in morbid productions, but I am most anxious to direct attention to the peculiar appearances, and to the modifications of character, to which such effusion and absorption give rise.

*Treatment.*—If there is reason to believe that any fungoid growth, or diseased production, either arising in, or proceeding from, the eye-ball, has arisen from, or is aggravated by, a deranged and disturbed condition of the alimentary canal, (that fertile source of diseased changes,) it would be proper to adopt that plan of treatment, which, on general principles, appears to be best adapted to the circumstances of the particular case. And in all cases, where the growth is considerable, where its progress is rapid, and where it is producing great suffering, and undermining the patient's health, it would be right to propose its removal by a surgical operation ; but, if that be objected to, then we can only palliate existing symptoms. If there be much local pain, the various applications composed of narcotic substances, will be necessary, with the administration of opium, acetate of morphia, or black drop ; and if there be much fetor from the diseased surface, we cannot do better than use the common lotio sodæ chloruretis ; and, what is always important, where there is a large, foul, fungoid substance protruding externally, and discharging its fetid secretions, carefully cleanse the surrounding skin with a little warm milk and water, or the patient's suffering may be materially increased by the excoriation and the irritation the lodgment of such matters will be likely to occasion. When the patient is experiencing great agony from tension of the globe, produced by the increase of the disease within it, it may be sometimes requisite to puncture the cornea, and permit its escape, and this may be consented to when insuperable objections will be made to the extirpation of the eye-ball.

## SECTION V.—OPHTHALMITIS.

Under the term *ophthalmitis* is usually described a general inflammatory condition of the eye, as though its entire textures had become suddenly and almost simultaneously affected. I have seen what may be called general inflammation of the eye-ball, under the following circumstances. When one of the internal textures of the eye has become acutely inflamed, and no measures have been employed for its subduction, other textures may participate, and the inflammation may extend to all the tunics of this organ. Or, a person may receive a severe blow upon the eye, which, without lacerating any of its membranes, may so injure and shake every part of it, that a general inflammation of all its tunics may be produced. And finally, external ophthalmia, when unusually severe, neglected, or much mismanaged, may extend and involve the textures of the eye generally. Now, in such cases, the symptoms are variable, for the disease may implicate nearly the whole of the textures of the eye very severely, but only slightly affect the remainder; it may, for instance, chiefly affect the conjunctiva or the sclerotica, the iris or the choroid, and merely attack the other tunics in a much diminished degree. Hence there will be a great difference in the symptoms; for, as the inflammations of the separate tunics of the eye are each attended with a particular set of symptoms, which symptoms they produce in every case, and under all circumstances, there will be remarked a difference in the symptoms of ophthalmitis, according to the greater or lesser affection of any particular texture.

General inflammation of the eye-ball is an extremely painful disease, and frequently leads to suppuration of the globe ;—the inflamed textures produce a secretion of pus, the inner membranes become absorbed, the cornea ruptures, the remainder of the contents of the eye-ball—that portion of them which has not been absorbed—is discharged, and the eye-ball collapses.

In the course of my remarks on the anatomy of the eye, I have represented why the inflammation of the sclerotica may readily extend to other of its membranes, and particularly pointed out the numerous and intimate communications subsisting between the internal and the external circulation of the eye; I have also explained that the occurrence of chemosis is one means of limiting inflammation of the eye—of preventing its extension from the external to the internal parts of the organ of vision.

*Local symptoms.*—The local symptoms of ophthalmitis are equally severe and well-marked. There will be intense redness of the exterior of the eye-ball, the vessels of the conjunctiva and sclerotica will be very evidently enlarged and distinguished from each other; there will also be tension of the globe, intolerance of light, pulsating or darting agony deep in the eye-ball, and severe frontal and occipital pain, or hemicrania. To these symptoms will be added those particular indications of the special or greater affection of the particular texture or textures which in any given case may exist, and which, having previously described, I need not enlarge upon now.

The constitutional symptoms will also be severe; there will be great irritability and excitement of the system—a frequent pulse, furred tongue, heated skin, suppressed secretions, and intense pain in the head, with restlessness, thirst, and want of appetite. The symptoms may indeed be as severe as those accompanying retinitis, and may demand the prompt employment of the most active and energetic treatment. The symptoms of ophthalmitis may establish themselves slowly or very rapidly indeed—this will mainly depend on the cause of the malady; for instance, concussion of the eye-ball may agitate its textures generally, and, under the influence of this suddenly applied agent, acute inflammation of nearly every tunic of the eye may rapidly take place; in other instances the attack may be less sudden, the symptoms will be mild at first, and will not suddenly arrange themselves; it may indeed be a disease of slow progression. Sometimes the symptoms will be so intense, and will establish themselves so quickly, that purulent matter may be secreted at a very early period indeed, and, if these acute symptoms lead to suppuration of the eye-ball, we shall be apprised of the circumstance by a temporary diminution of pain, and probably also by the occurrence of rigors.

The more frequent consequences or terminations of severe ophthalmitis are, suppuration and atrophy of the eye-ball, hydrophthalmia, and staphyloma.

*Treatment.*—Active depletion is the remedial measure to be chiefly relied on for the subduction of ophthalmitis; we must bleed promptly, freely, and repeatedly in this affection, so long as the severe pain and acute inflammation continue, and the patient's strength permits, for, if we do not so deplete, we cannot say that the mischief will even be limited to the loss of the eye—the brain may become affected, and the patient's life may eventually be endangered; general and local bleeding must, therefore, be employed with promptitude and a due degree of perseverence—a perseverance regulated by the obstinacy and intensity of the symptoms, and by the strength of the patient.

Purgatives should also be freely administered, beginning with an active dose of calomel and jalap, and afterwards keeping the bowels freely relaxed by the use of saline purgatives.

Nauseants will also be proper to keep down the vigour of the circulation, and they will be chiefly important after venesection has been practised in strong plethoric subjects, and we may sometimes prescribe, with great advantage, pretty liberal doses of the vinum colchici.

Fomentations of an anodyne character,* or cold lotions, (regulated by the feelings of the patient) may also be required, and, at the latter stages of the affection, we may often hasten the dismissal of the irritation which is apt to linger, by the employment of blisters (which should be kept discharging by means of the savine cerate) in the neighbourhood of the affected part.

Astringent lotions and the nitrate of silver drops may be required, with the view of contracting enlarged vessels, removing chronic inflammation, and preventing the eye-ball from becoming staphylomatous, or of limiting the magnitude of any staphyloma the continuance and the severity of the disease may have produced.

When suppuration of the eye-ball has occurred, and the pain, though slightly diminished, still continues with great severity, and the external tunics do not seem about to give way, it would be prudent to make a free opening in the cornea, and encourage the complete collapse of the eye-ball. Of course, no chance of restoring vision remains, and the continuance of great irritation in one eye endangers the safety of its fellow.

---

* It is my usual plan to direct the nurse in attendance to prepare a strong decoction of poppies, and, when quite boiling, to pour it upon a fine soft flannel bag, previously filled with camomile flowers. This flannel bag should be constantly applied to the eye, and kept warm and effective by the occasional addition of the heated decoction of poppies. The application of a preparation consisting of equal parts of æther and laudanum to the forehead and cheek, is also another means of soothing the pain, and lessening the inflammation of the eye.

## SECTION VI—HYDROPHTHALMIA.

The cavities of the body which naturally contain a serous or watery fluid, are liable, when the secretion of such fluid is long suspended, to become annihilated by accretion to each other, or to neighbouring parts; or, when their secretion becomes increased, to experience considerable enlargement. The cavities of the eye which contain the aqueous and vitreous humors, are in like manner subject to variation in their magnitude. When the aqueous and vitreous humors are diminished in quantity, the cavities naturally containing them shrink, the magnitude of the eye-ball is diminished, and the eye is said to be in a state of atrophy; but when these secretions are much increased in quantity, the eye is said to be dropsical, either as regards its totality, or the particular cavity in which the increased secretion is situated. Of course, it is essential to dropsy of the eye, that the accumulated fluid should be somewhat similar to its healthy liquid secretions. Dropsy of the eye-ball appears to me to be a mere local defect, not arising from constitutional causes, from metastasis, or any circumstances of such a nature. It was, however, formerly considered to be associated with the same causes as dropsy in other situations, and its pathology was that of general dropsy, and in conformity with these views, its treatment consisted in the administration of diuretics and purgatives, the removal of blood, &c. By degrees, it was considered necessary to combine surgical and medical treatment, for the relief of the affection, thus, Dr. Monro admits, that " when the eye is large, and medicines cannot diminish it, a small incision must be made into the lower part of the cornea, to let out the water."* At the present time we do not however, expect any material benefit from the adoption of any plan of treatment which does not include the evacuation of a certain part of the augmented contents of the globe, or some other surgical proceeding, having for its object, the production of a diminished plenitude of the eye-ball.

The varieties of dropsy of the eye are five; namely, dropsy of the aqueous humor; dropsy of the vitreous humor; dropsy of both the aqueous and vitreous humors; subsclerotic dropsy; and subchoroid dropsy. Having already treated of the latter in my remarks on choroiditis, and as subsclerotic dropsy very rarely occurs, and then only in a slight degree, I shall confine my observations to the three former varieties of dropsy.

DROPSY OF THE AQUEOUS HUMOR.—*Symptoms.*—The cornea is at first somewhat prominent, and afterwards becomes flattened, extended and enlarged, the pupil is dilated, and its action is sluggish. The patient is far-sighted, his vision is impaired, there is a sense of fulness and tension of the globe, and slight uneasiness of the head. The cornea is cloudy, but by no means decidedly opaque, the iris is pushed towards the lens, and frequently becomes vacillating, and the anterior chamber is greatly enlarged. If no measures be taken to relieve or remove the disease, which still continues to increase, the cornea bursts, the aqueous humor is discharged, and, very probably also, the lens and part of the vitreous humor, and the eye-ball may collapse.

During the existence of inflammation of the cornea and of the membrane of the aqueous humor, (especially when these diseases occur in children) the cornea is rendered prominent, the iris appears to be rather remote from the cornea, and the anterior chamber enlarged. Sometimes these appearances continue after the disease which produced them is removed; sometimes they disappear with the malady which caused them. Sometimes the anterior chamber is larger than it ought to be from birth, and then the cornea is generally opaque at some part of its surface, but generally towards its margin. With dropsy of the aqueous humor there may be an unduly convex or a very prominent state of the cornea, so that, as the one or other of these defects may happen to exist, the disease may be attended with near or far-sightedness. When the cornea is enlarged, the iris remote from its neural surface, and the pupil dilated, the case is said to be " dropsy of the anterior chamber;" on the contrary, when the pupil is small, the iris convex anteriorly, and when there is a projection, or a sort of *appearance* of projection, at or a little behind the corneo-sclerotic junction, the disease is termed "dropsy of the posterior chamber." Dropsy of the anterior chamber is commonly attended with a flattening of the cornea, whilst dropsy of the posterior chamber, on the contrary, is more generally associated with an increased convexity of that membrane.

---

* *An essay on the dropsy and its different species*, by Donald MONRO, M.D. p. 204. London, 1756.

***Causes.***—I do not know that I can supply much information respecting the causes of this disease. I have had reason to believe that a preternaturally attenuated or weakened state of the cornea, or a blow which has impaired the resisting power of that tunic, have generally preceded the establishment of dropsy of the aqueous humor. I do not think it can take place so long as the integrity of the texture of the cornea is unimpaired. The idea that this disease originates in an increased density of the cornea by which the pores, through which the aqueous humor was presumed to transpire, became obstructed, has been sufficiently refuted and ridiculed by **Scarpa**, and need not be further mentioned. In expressing my belief that dropsy of the aqueous humor cannot take place so long as the cornea is in a perfectly healthy and natural state, I, of course, exclude many of those causes which many writers have enumerated, such, for instance, as a cachectic state of the system, a general dropsical diathesis, the sudden stoppage of some accustomed discharge, chlorosis, and so on.

*Prognosis.*—The prognosis of this malady will always be unfavourable, for, under the least adverse circumstances, we cannot do more than preserve a mere capacity to distinguish the degrees of light.

*Treatment.*—The effect of remedies upon dropsy of the aqueous humor would go far to substantiate my position in reference to its causes, even if there existed no other evidence in its favour; for, as far as I know, the disease is never cured, although it may be prevented from proceeding to rupture of the cornea. If there be much tension of the cornea and much local uneasiness, if that texture appear attenuated and cloudy as though it were about to give way, it would be adviseable to make a small puncture in it and discharge the aqueous fluid—not as the surgeons of by-gone days were accustomed to do, with a trochar, the canula of which was to be rotated pretty freely, and through which the eye-ball was to be injected, (just in the same way, and for the same purpose as we should effect the cure of hydrocele by withdrawing the fluid, and afterwards injecting the cavity which contained it,) but with a fine cataract knife at its lower part—and it would be desirable simply to make a small incision of the cornea, which should be suffered to heal, just as under ordinary circumstances. The practice of maintaining the patency of the aperture which has been made, by the introduction of a tent, as advised by MAUCHART, cannot be sufficiently condemned. Now, it may be necessary to repeat this operation several times; symptoms produced by the reaccumulation of the fluid, may require its repetition, and there is no important objection, (except the pain it excites) to its repeated performance; however, after it has been once performed the fluid may not reaccumulate, or the measures that may be adopted may render any subsequent puncture of the cornea quite unnecessary. Pressure has been employed, and the celebrated NUCK tried it in one instance with complete success; he placed a thin piece of lead, having a concave surface internally, upon the eye-ball after he had removed the dropsical fluid by the operation of paracentesis, and having drawn the eye-lids over this plate of lead, he secured the closure of the lids, and consequently the confinement of the leaden plate, by a proper bandage. This case, at least proves that it is *possible* to prevent the morbid reaccumulation of the aqueous humor by the adoption of this tedious and painful mode of treatment. The application of pressure to the distended globe, the attenuated cornea, and the prominent eye, will, however, be attended with great pain, will, in the general, be productive of no advantage, and will, most probably, induce ulceration of the cornea.[*]

Purgatives and medicines calculated to improve the general health are useful, and where the disease is associated with impaired health, or a cachectic habit, we may advantageously prescribe the mineral acids, or the sulphate of quina. They who entertain opinions respecting the cause of this disease, different from those I have mentioned, would pay still greater attention to constitutional treatment, and would doubtless advise some particular class of remedies in accordance with what they conceived to be the precise cause of the disease, whether that cause be the sudden healing of some sore, which had been discharging for many years—chlorosis—cachexy—general dropsy, and so on.

---

[*] BLANCARD, HEISTER, and BOERHAAVE recommend the cure of hydrophthalmia to be attempted by making an opening in the cornea, discharging a part of the fluid contents of the eye-ball, and then applying pressure as a means of preventing its reaccumulation. MR. FORD relates several cases (See *Medical communications*, Vol. i. p. 409.) of hydrophthalmia, which were cured " by means of a seton." MR. EDWARDS mentions the particulars of a case of dropsy of the eye-ball, caused by a blow, which was cured, even so far as to permit the restoration of a certain degree of sight, by inserting " a flat lancet pointed trochar behind the iris," so as to allow " as much of the aqueous humor to escape as was considered necessary." *Medical and physical journal*, Vol. xxiii. p. 125.

However, I must not close my remarks without insisting upon the necessity of instituting some plan of counter-irritation; I am persuaded I have prevented the disease from advancing in several instances, and have prevented it from causing any serious irritation in others, after the cornea has been once punctured, solely by the persevering employment of some active form of counter-irritation.

DROPSY OF THE VITREOUS HUMOR.—This is the most frequent form of dropsy of the eye, and differs, in many particulars, from dropsy of the aqueous humor. It appears to me that it can only take place when the integrity of the sclerotic texture has been impaired.

*Symptoms.*—The eye-ball increases in magnitude from behind, the globe is elongated from before backwards, the cornea is rendered very prominent, and the patient becomes near-sighted; the crystalline lens is pushed towards the iris, and the latter membrane towards the cornea, so as to present a very convex surface anteriorly; the pupil is neither much contracted nor materially dilated, its action is at first sluggish, and it is eventually totally destroyed, and the aqueous humor is slightly turbid; vision is, at the same time, much impaired, and there is a sense of tension and evident enlargement of the globe. As the disease advances the cornea becomes flattened and expanded, as though it had been "beaten out" between two hard substances; the iris is nearly in contact with the neural surface of the cornea; the pupil expanded and motionless, and vision entirely destroyed; the sense of tension of the globe is much increased, the sclerotica attenuated, and of a bluish or dark brown colour, particularly around the margin of the cornea; and the eye-ball so much enlarged as scarcely to be contained within its socket, and covered by the lids. At the same time there is severe local pain—pain situated deep within the orbit, a dreadful sensation of tension of the globe, and a most distracting agony darting from the eye-ball into the face and head; this darting pain is so severe that the patient will consent to any operation that may be recommended with a view of affording relief. BEER mentions his acquaintance with a man who suffered in this manner from dropsy of the vitreous humor so severely that, in the intensity of his agony, he punctured the eye-ball with a pen-knife.*

In addition to these symptoms it will be imagined that severe constitutional irritation will be produced by so much local pain; such symptoms do, in fact, occur, and they are such as any painful and excessively irritating local malady would have a tendency to excite.

If this state of things is not relieved by surgical means, rupture of the external tunics takes place, and partial discharge of the contents of the globe, but as this commonly occurs only after the patient has suffered very severely, and, in a great measure, unnecessarily, it is our duty to interfere and palliate, if we cannot cure, the disease. Pressure upon the external tunics of the eye produces their absorption, the partial absorption of the sclerotica leads to its attenuation, this attenuation will be greater at some particular point than upon its structure generally, and at this point it will rupture, and even when a great part of the contents of the eye-ball is discharged, and what is termed a natural cure is effected, the situation of the rent in the sclerotica may be the site of a staphylomatous enlargement. There is another effect of dropsy of the vitreous humor, which it is necessary to mention. As the eye increases, it becomes firmly wedged in the socket, from whence, as the disease advances, it is gradually protruded, so that the muscles are unable to move it in any direction. This, then, is one of the symptoms and effects of an extreme case, or an advanced stage of dropsy of the vitreous humor, and also of general dropsy of the eye-ball, namely, a motionless state of the globe of the eye.

---

* WARNER mentions a case in which he deemed it adviseable to extirpate the eye-ball, on account of dropsical enlargement. (*A description of the human eye, together with their principal diseases*, p. 47). I believe that this operation is never required, and that the disease is much better treated, even in extreme cases, either by the operation of paracentesis, or by the excision of a portion of the cornea.

In every eye affected with dropsy of the vitreous humor I have had an opportunity of examining, the cellular or reticular arrangement of the hyaloid membrane has been destroyed.

*Causes.*—Among the causes of dropsy of the vitreous humor may be mentioned; a preternaturally feeble organization of the sclerotica, or an impairment of its resisting power—an impairment of its integrity by inflammation or local injury. I do not think it has any connexion with a general dropsical diathesis, for I have never witnessed a single case of hydrophthalmia, in any of the many instances of general dropsy it has fallen to my lot to notice, and this statement corresponds with the experience of all my medical friends.

*Treatment.*—I must again recommend the paracentesis oculi, notwithstanding the objection of SCARPA, who, in its stead, has proposed a somewhat hazardous operation, and one which, as comprising the risk of severe consequences, I should be unwilling to practice so long as the disease could be prevented from increasing by means of milder measures. Of course, it would be prudent to puncture the sclerotica at a sufficient distance from the margin of the cornea, and so to direct the point of the needle as to avoid piercing and displacing the lens, and it would also be necessary to operate with a fine grooved needle. As scarcely any pain is caused by this operation, and as it is succeeded by scarcely any uneasiness even of the most temporary nature, it may be repeated as frequently as the tension of the globe or other symptoms may indicate a necessity for its performance. This is the palliative treatment of dropsy of the vitreous humor, but it is not always thus limited in its beneficial operation, for the gradual collapse of the eye-ball may take place, and the eye may remain in a permanently diminished state—however, we can scarcely calculate upon so fortunate a result.

The use of purgatives is just as necessary in this as in the former variety of hydrophthalmia. Blisters, or setons, or some form of counter-irritation is also clearly called for, and constitute a very important part of the treatment, in as far as they relieve the pain which is always present. Any external ophthalmia which may occur will require merely the ordinary remedies for its removal, but must not be considered a *necessary* concomitant of the more important malady.

If acute inflammation succeeds the puncture of the sclerotica, and the eye-ball becomes greatly inflamed and distended, it would be right to divide the cornea as recommended by BEER, and it would be adviseable to empty the globe partially by withdrawing the lens and pressing out as much of the vitreous humor as can be conveniently discharged without causing the patient much pain. **Beer** recommends the administration of calomel and digitalis, and he speaks very decidedly to the advantages resulting from their use, but according to my notions of the pathology of this affection, his plan of treatment is not likely to be productive of much benefit. I am persuaded that, if acting on such opinions respecting the pathology of hydrophthalmia, we allow the tunics of the eye to continue distended, the disease will increase, and the outer membranes of the eye will become more and more weakened, until they give way and permit the evacuation of their contents.

**Dropsy of the aqueous and vitreous humors.**—Dropsy of both the aqueous and vitreous humors may occur, and, according to the statement of **Scarpa**, this combined affection takes place by no means infrequently. However, I have never seen a genuine example of this general dropsical affection of the globe; dropsy either of the aqueous or of the vitreous humor I have seen very many times, but I have not witnessed a single example of this variety of dropsy of the globe.

The uniform enlargement of every part of the exterior of the eye-ball, and its great magnitude would, of course, distinguish it from its other varieties; its history and also its mode of termination would be very similar to those of dropsy of the vitreous humor, and the treatment it would require would be the same, except that if the patient would not submit to the repeated tapping of the globe, it would be desirable to perform the kind of operation recommended by **Scarpa**, or, the modified operation of **Beer**. I will state what kind of operation I would myself perform under such circumstances, that is, presuming my patient refused to await the chance of a radical cure from the paracentesis oculi. Having arranged the patient's position as for the operation of extraction, I would pass a cataract knife through the cornea—through its temporal and nasal sides—and, with a forceps, grasp the flap so formed and detach it with an upward stroke of the knife, forming, in this manner, a long narrow aperture in the centre of that tunic, through which the lens and a portion of the fluid contents of the globe should be discharged. A fold of linen merely should be then loosely bound upon the eye, and the patient kept at rest in a dark apartment for several days. If severe pain and a sense of tension of the globe then took place, it would be adviseable to examine the state of the eye, and if the patient's sufferings were owing to inflammation, proper measures should be employed for its subduction, but if it were dependent on the accumulation of fluid in the globe, the aperture in the cornea being filled up by a coagulum, or by a prolapsus of the iris, the introduction of a probe and the discharge of this fresh accumulation would procure instant relief. SCARPA, who seems to have had great experience in this disease, expects to obtain a radical cure by means of this operation, and by the degree of inflammation it generally excites, and he has given some very particular directions respecting the precise dimensions of the portion of the cornea it may be necessary to remove in order to procure the desired effect, and nothing beyond it. He says, if too large a portion be removed, serious inflammation may arise which may even proceed so far as to place the life of the patient in jeopardy, and, on the contrary, if too small a portion of the cornea be taken away, the radical cure will not take place. This necessary, though moderate degree of inflammation, is indicated by swelling of the lids, pain and tension of the eye-ball, and occurs after the operation at a period varying from three to five days. Of course, there can be no question that severe symptoms would be likely to occur if we were to remove a large portion of the front of the eye, and give rise to inflammation of the whole interior of the large surface which exists when the globe is so greatly enlarged as it is in hydrophthalmia.

### SECTION VII.—SUPPURATION OF THE EYE-BALL.

Suppuration of the eye-ball may arise from various causes, and is almost always attended with great pain, and with the total loss of vision. When suppuration of the eye-ball (as a sequel of ophthalmitis) commences, there is a sense of fulness and tension of the globe, with rigors, severe frontal or circumorbital pain, or hemicrania; the cornea becomes somewhat oqaque and prominent, the lens is pushed forwards, and there is present a certain degree of external ophthalmia, but afterwards—at a later stage of the affection—at that stage just anterior to the rupture of the external tunics—there is a most distressing sense of tension of the eye-ball, attended with a throbbing sensation, similar to that experienced in acute paronychia, there is intense pain in the forehead, around the orbit and the cheek of the affected side, and also severe hemicrania; the eye-ball is visibly enlarged, the sclerotica attenuated, the lens is forced against the neural surface of the cornea, which is opaque, and of a dull, dirty, ashy colour, or the chambers of the eye may be filled with a quantity of purulent fluid, the lens retaining its natural situation; there is considerable external ophthalmia, the conjunctiva is thickened, increased in vascularity and everted; the eye-ball appears to bulge forward, as though it were too large for its orbit, and the palpebræ are extremely tumid, partly from œdema, and partly from the enormous dilatation of their more superficial vessels. Finally, the cornea gives way, and the contents of the eye-ball are discharged—it either ruptures after having detached many of its layers by sloughing, or it ulcerates through the whole of its lamellæ, or it yields by a process of laceration, having its power of resistance previously materially impaired by a diminution of its degree of vitality. Presuming that the cornea has ulcerated throughout the whole of its layers, a small opening only will be formed at first, through which that quantity of pus which exists in the chambers of the eye, and in front of the lens (which I am now supposing to have retained its natural situation) will alone be discharged; for when this is evacuated, the action of the muscles of the globe will force the lens forwards, and will prevent the escape of the fluid behind it; and when this takes place, the opening in the cornea had better be enlarged, so as to permit the escape of the lens and the collapse of the eye-ball. In other instances where the cornea is lacerated from weakness of its texture, whether produced by sloughing or diminution of its vitality, the opening is sufficiently large to admit of the free and prompt discharge of the lens, and also of the fluid contents of the eye-ball. It has been said that the matter sometimes escapes through an opening in the sclerotica, but I have never witnessed such an occurrence, and, knowing the firmness of this tunic, and its indisposition to accept the sloughing or ulcerative process, I am inclined to think it very seldom indeed occurs. Where suppuration of the eye-ball occurs in connexion with acute inflammatory chemosis, I have known, in two or three instances, the pus contained in the globe to be discharged by an opening—a lacerated opening—in the sclerotica just behind the margin of the cornea. In these cases, matter has been secreted from the interior of the globe, and evacuated through this aperture, which has acquired a semi-fistulous character, and it has been a very long time before atrophy of the eye-ball has taken place.

When the contents of the globe are discharged, the eye-ball collapses, that is, the opening in the cornea closes by a process of contraction,—the sides of the divided cornea being connected and drawn together by means of an inflammatory deposition, which eventually becomes, in a great measure absorbed, with a great part of the cornea, where it has not been extensively destroyed by sloughing or ulceration; the sclerotica is puckered anteriorly, and appears so to shrink, or contract, or to have become absorbed, as to constitute merely the little knob which ultimately exists as the only remnant of the eye-ball. I do not mean to state positively that the sclerotica is always much absorbed after suppuration of the globe, but, certainly, it becomes in some way or other so adapted to altered circumstances, that its extent of surface, and its apparent volume are materially diminished, and I believe this is occasioned by a process of absorption, just in the same way as superfluous parts, in other situations, are removed by absorption; for this change does not occur suddenly, but occupies a considerable period before it is completed—before the eye-ball shrinks to the small flattened figure it eventually assumes.

It may be asked, of what does the collapsed eye-ball consist? what is the precise nature of that structure which is enclosed by the sclerotica in collapse of the eye-ball consequent on suppuration of the globe? In fact, there is nothing more than a small quantity of firm fibrous matter, which appears to be little else than an hypertrophied state of the cellular part of the inner tunics, which originally constituted a great proportion of their structure. The greater bulk of the tumour is formed by the sclerotica, the remainder, consisting of a firm, fibrous, yellowish, or yellowish-brown substance.

*Causes.*—Suppuration of the eye-ball generally arises from ophthalmitis, whether idiopathic or traumatic ; from gonorrhœal, or purulent ophthalmia, or some equally severe form of inflammation of the eye; but the experiments of **Magendie** prove that it may also arise from injury to certain nerves, of which, until the publication of his experiments, we had scarcely any knowledge. He divided the fifth pair of nerves in the temporal fossa, and he found that the cornea became slightly opaque twenty-four hours afterwards, and that five or six days after the division of the nerve, it was " de la blancheur de l'abâtre."* Towards the eighth day the cornea was separated in part from its connexion with the sclerotica, and finally ulcerated, so as to permit the discharge of the humors of the eye, which were *thick* and partly opaque; the eye-ball then collapsed. In fact, subsequent experiments proved that suppuration of the eye-ball generally follows the section of the fifth pair of nerves, on the side upon which such section has been made. Injury, or disease of the fifth pair of nerves, is, undoubtedly, one of the causes of suppuration of the globe.

Suppuration of the eye-ball has sometimes followed the ligature of the carotid artery, and the same occurrence has taken place after the performance of other severe operations, just in the same way, I presume, in this latter instance, as purulent deposits are apt to occur in various parts of the body, after any important and severe surgical operation. Inflammation of the veins is sometimes succeeded by suppuration of the eye-ball, in whatever part of the body the phlebitis may occur; but as the uterine, the femoral, and the iliac veins are more generally the seat of inflammation in connexion with parturition, suppuration of the globe is consequently more frequently referable to their inflammation than to that of the veins in other situations. Suppuration of the eye-ball, consequent on any great impairment of the qualities of the blood, appears to differ from the same condition of the disease, arising from diminished nutrition of the globe, in as far as the latter stage of disease is preceded by a greater degree of chemosis, and by a more complete series of manifest morbid changes in the cornea. Division, or disease of the fifth pair of nerves, the ligature of the carotid artery, &c., would appear to cause suppuration of the eye-ball, by impairing its nutrition; phlebitis, certain fevers, cholera, &c., would seem to cause the suppuration of the globe, by inducing particular morbid changes in the blood, or by causing the vital fluid to be mixed with various diseased secretions; and, on the other hand, the suppuration of the globe sometimes following the performance of severe surgical operations, would seem to depend on the shock the system has received, or, at all events, to originate in the same circumstances, which occasion the occurrence of purulent deposits in other parts of the body, after persons have been subjected to serious injuries, or after they have sustained the shock of a surgical operation.

---

* *Journal de physiologie expérimentale*, T. iv. p. 176, et. 302.

During the time the cholera prevailed so very extensively in the neighbourhood of Birmingham, I had an opportunity of observing several cases of suppuration of the eye-ball, which occurred, for the most part, during convalescence, but, in some of which, the disease of the eye took place whilst the symptoms of cholera were at their height. This condition of disease occurred only in one eye, but it sometimes happened that the vision of the other organ was slightly impaired, so that, on this account, they either came to me or were sent to me by their medical attendant. For some time after the cholera had declined, I had an opportunity of seeing a few cases of this nature, not being consulted on account of the suppurated organ, but in consequence of some slight defect in, or accident to, the other. I pointed out the circumstance at the time, but, as it could fall to the lot of but few persons to see the disease in many instances, I suppose it was merely noticed as a coincidence, rather than as an event bearing the relation of effect to the more serious malady. My position was so far peculiar, that, without witnessing the original malady, I had an opportunity of observing one of its rare effects more frequently perhaps than most surgeons in my neighbourhood. In the course of a brief communication addressed to the editor of the *Medical Gazette*, I remarked that, "in every case of suppuration of the eye-ball originating in cholera, which has fallen under my notice, the eye had sustained no inflammation adequate to the production of much pain; the uneasiness of which the subjects of the malady complained, only occured when the globe became distended in those instances where the cornea did not ulcerate and slough, and permit the evacuation of the fluids contained in the eye-ball."* Since the publication of these remarks, I have had no opportunity of increasing my experience respecting the occurrence of the suppurating disease of the eye, attending or consequent on a condition of cholera.

I need scarcely mention that vision is always destroyed by the suppuration of the eye-ball, but it is necessary to state, that other evils are to be apprehended when the disease is remarkably severe and rapid in its course—when the external tunics do not yield to the pressure from within—when the patient's health is much disturbed—and finally, when, under this condition of things, the patient obstinately refuses to permit the globe to be punctured. The opposite eye may become very irritable, and the sight of it may be endangered; severe irritative fever may arise; or inflammation may occur in the membranes of the brain; one or all of these events may take place, for they have occurred under my own observation; and persons have not only lost the sight of the opposite eye to that in which the suppuration existed, but they have even lost their lives owing to the severe irritative fever, and the affection of the brain, which, as I have stated, may supervene upon this painful disease of the eye-ball. However, it is right to endeavour to make a clear distinction between the effects of the mere suppuration of the globe, and of that state of health—that pathological condition of other parts—or that series of circumstances which gave rise to the purulent secretion in the eye-ball, or augmented the severity of the symptoms connected with it.

---

* Vol. xii. page 492.

*Treatment.*—The treatment of suppuration of the eye-ball requires considerable caution. In the first place, it would be proper to attend at once to the constitutional symptoms whenever they are severe, and if there is much feverish excitement, or any indication of, or tendency to, mischief in the brain or its membranes, it might be necessary to bleed rather copiously, and act pretty freely upon the bowels; however, if the system be merely irritable from the pain occasioned by the local disease, the attention should be more particularly directed to the relief of the local malady. If there be still much inflammation of the eye, leeches may be applied to the eye-lids and just above the eye-brow; if there be much tension of the eye-ball, and the cornea does not appear likely to give way, it would be desirable to make a free opening in it, and evacuate the contents of the globe; and lastly, a bread poultice mixed with goulard or poppy water, may be applied, or the eye may be frequently bathed with a little warm aqueous solution of opium, or with a strong decoction of poppies. Of course, the treatment will be regulated by the stage of the disease, and the severity of the symptoms; bleeding will often be necessary at an early stage of the affection, because at that period a part of the inflammation upon which the suppuration of the globe depended, may remain, but, afterwards, when the suppuration of the eye-ball is complete and when the eye only retains its spherical form because the matter is confined, no depletion will be required, for the powers of the system are then frequently reduced, by the severity and the continuance of the pain, to the lowest ebb. As regards the puncturing of the eye-ball, that is by far the most important part of the treatment,* and is always urgently called for when the symptoms of suppuration are unequivocally established, and when the tension of the globe is a source of much suffering. Not only is instant relief obtained by discharging the contents of the eye-ball under such circumstances, but the patient is also relieved from that state of jeopardy—from that risk of severe constitutional irritation, and of a dangerous affection of the brain and its membranes—which previously existed. And then, with respect to diet--that should be modified by existing symptoms; generally speaking, it should consist of the simplest and mildest articles of food, (such as tea, gruel, and weak broth) until the contents of the eye-ball are discharged, and afterwards a more nutritious, and even a stimulating diet may be allowed. In fact, the diet of such patients must be regulated on general principles, taking into consideration, *first*, the stage of excitement; *secondly*, the period of irritation; and *lastly*, the season of debility and exhaustion. This treatment will comprehend the management of all cases of suppuration of the eye-ball, whether produced by local injury, by ophthalmitis, or some other severe inflammatory affection of the eye.

---

* Bidloo has written a long article "de oculo purulento," and, like many of the old writers, has described, with great and unnecessary minuteness, the manner in which the contents of the suppurated organ should be discharged. A free and rapid section of the front part of the globe with a lancet is all that is required, but, of course, if any part of the tunics of the eye is more bulged than another, it would be desirable to open it at that, its most prominent, point.

I need not enter upon the treatment of suppuration of the globe consequent on malignant fevers, cholera, phlebitis, ligature of the carotid artery, injury to, or division of, the fifth pair of nerves, or diminished nutrition of the eye however caused, except to mention that whenever the matter collects in a sufficiently large quantity to produce a painful state of tension of the globe, the cornea should be opened, and the confined secretions evacuated. It may happen that a foreign body has entered the eye-ball and is exciting great pain, and producing suppuration of that organ, and then, of course, it would be desirable to select some suitable operation for the removal of the source of irritation.

## SECTION VIII.—ATROPHY OF THE EYE-BALL.

When, from any cause, the aqueous and vitreous humors become much diminished in quantity, the cavities naturally containing them contract, and accomodate their dimensions to the lessened volume of these humors, in obedience to a general law of the system which appears to enjoin the partial or total removal of all absolutely unnecessary parts. The actual substance composing the tunics of the eye also becomes diminished, and, as this process continues, (the diminution in the quantity of the aqueous and vitreous humors, and the corresponding diminution of the cavities destined to contain them) the tunics of the eye are still further absorbed, the chambers of the eye are destroyed, and the whole of the globe is reduced to a small knob similar in form and in appearance to that which is witnessed after suppuration of the globe—a mere remnant of the eye-ball consisting chiefly of the sclerotica. This wasting of the eye-ball, proceeding from diminished secretion of the aqueous and vitreous humors, is termed atrophy, and is denoted at its commencement, by a softened state of the globe and a flaccid appearance of the eye-ball. It is sometimes a consequence of severe inflammation, sometimes the result of a blow, and sometimes apparently the effect of a generally enfeebled and emaciated condition of the system. I think I have noticed it as a consequence of over-exertion—excessive employment of the organ. I have never observed an eye diminished in magnitude, whilst its humors and various textures have been natural in other respects. I repeat, that wasting of the eye-ball may, in my opinion, be sometimes caused by over exertion, undue employment, just as atrophy of other parts succeeds the excessive and exhausting use of them. Where the symptoms are commencing and appear to depend on excessive employment of the organ, a very natural mode of treatment at once suggests itself, that is—*rest*. If it appear to be owing to an enfeebled condition of the system, the treatment of the eye merges into the treatment of that state of general debility. When it takes place in consequence of a blow upon the eye, I am not aware of any remedies which will render any material service in checking the progress of the atrophied condition of the eye, whatever may be their controlling influence over the ophthalmia, the local injury may, at the same time, have excited. Severe concussion of a part will sometimes cause, or, I should rather say, lead to its absorption, and we know that the iris occasionally becomes absorbed from a blow upon the eye.

Upon the whole these cases are extremely unsatisfactory in their termination, generally, indeed almost always, ending in the loss of all useful vision.

In investigating the causes of atrophy of the eye-ball, we must inquire into all the circumstances which are capable of exerting an influence upon the nutrition of that organ. It will be remembered that atrophy of the eye-ball has occurred from tumours in the brain, from injury to, and especially from division of, the fifth pair of nerves, and after the sudden obliteration of the common carotid artery. In some instances where the operation of extraction has been apparently successfully performed, a certain degree of atrophy of the eye-ball has occurred and interfered with its satisfactory result, and in the two examples of this kind I have noticed, the corneal section has been unusually large. A man called upon me some time ago, whose eye had been struck with a piece of metal, which had divided the cornea and penetrated the lens, where it could be distinctly observed. No serious inflammation followed this injury, no inflammation which was not readily controlled by treatment, but, in the course of a few years, the eye-ball gradually wasted until it was scarcely larger than a horse-bean. The cornea may still be distinguished from the sclerotica, the iris also may be seen, and even a minute aperture in its centre, which indicates the situation of the pupil; so that it would appear as though a simultaneous wasting of all the textures of the eye-ball had occurred, and had taken place pretty nearly in an equal degree in all of them. This, however, is not always the case, for the atrophy may affect one part more than another, giving rise to an appearance as though there existed a disproportionate development of the different structures of the organ of vision. This is more particularly noticed in the cornea, so that its texture may be almost altogether removed by absorption, whilst that of the sclerotica shall retain its usual, or almost its usual, magnitude.

## SECTION IX.—NEURALGIA OF THE EYE-BALL.

The eye-ball is sometimes affected with neuralgia, and I need scarcely say, that this disease is attended with great pain. Like neuralgia of other parts, it is seldom of long continuance, but when it is so continued as to be constantly present in degree, it is always much more severe at some periods than at others. As regards the nature of the pain, it is generally compared to an agonizing darting torture, of the most intensely severe description; and there is often combined with this pain in the eye, severe pain in the head and around the orbit. I have, indeed, heard persons of the greatest fortitude, express great apprehension lest the excess of their suffering should bereave them of their senses. I do not know that the neuralgic pain of the eye-ball is different from that produced by the existence of neuralgia in other situations, but I am confident it is quite as severe. The pain is, for the most part, of an intermittent character; it may, however, be constant, but then it generally happens that it is much more acute at some periods than at others, still it is always present in a certain degree. In short, there will be detected the same variation, with regard to the severity and duration of the pain, as occurs in neuralgia in other situations. Sometimes the eye-ball will remain healthy during an attack of neuralgia, but its surface may be rather redder whilst the pain continues, and the eye-lid at the same time generally droops, but, more commonly, it becomes atropic, and gradually wastes away to a mere nodule, such as is seen after suppuration of the globe, and when this occurs the pain ceases, that is, when the eye is completely atrophied; and this is a very frequent consequence of neuralgia in this situation, and it is a circumstance which I am quite unable to explain. In fact, I cannot tell why parts which are the seat of pain, should become diminished in size (atrophied), when no other circumstance than the mere existence of pain is present to account for the phenomenon; except, of course, when this diminution of volume occurs in muscular and some other parts, where the lessened use, the diminished exercise of the part, satisfactorily explains the wasting which then so generally takes place. In this last instance, however, the pain would appear to be in no way connected with the atrophy as its cause, except in as far as it induces the patient to keep the part in a state of comparative quietude. Neuralgia of the eye-ball is sometimes accompanied with a spasmodic action of its muscles, now and then it is suddenly darted as it were in various directions, and it may eventually acquire a rolling oscillatory motion, or the irregular or spasmodic movements of the globe may cease on the subsidence of the neuralgic pains. There is generally present a contracted state of the pupil with intolerance of light, and free lachrymation. Sometimes the pupil is somewhat angular and drawn from its central position, and this probably depends on the greater affection of certain of the ciliary nerves, as compared with others. Now and then the size of the pupil will suddenly vary, and from its usual condition become contracted to a mere pin-hole aperture. The intolerance of light is always complained of, but is particularly distressing during the neuralgic paroxysms. The lachrymal fluid discharged is described as being very hot, and, as far as the patient's feelings are concerned, resembles the scalding lachrymation accompanying strumous ophthalmia. Sometimes it gushes from the eye as a sort of frothy fluid, but it is more generally copious and clear.

*Treatment.*—If the pain is extremely severe, if it is not materially relieved by remedies the use of which has been continued for some time, it would be necessary to make a free opening in the eye-ball, or remove a portion of its anterior part, so as to induce rapid collapse, for this mode of procedure or the more serious operation of extirpation of the eye-ball, appears to furnish the only remaining chance of affording permanent relief from sufferings almost too severe for endurance. But it would be proper first to apply the belladonna to the eye-lids, and bathe the eye itself with some strong narcotic applications, such as, an aqueous solution of opium, or a strong decoction of poppies; to administer narcotics internally, such as opium, BATTLEY's black drop, conium, &c.; and try, as circumstances may indicate, the effect of the sulphate of quina, the acetate of lead, the carbonate of iron, and so on, that is, presuming there are no circumstances connected with the constitutional condition of the patient, which indicate the employment of other remedies. The case must be treated just as we should manage neuralgia of other parts, for there is nothing in the nature of this affection of the eye-ball, which would render it necessary to adopt any measures which would not be equally or almost equally applicable, when a similarly painful condition of the nerves occurs in other situations; not forgetting, of course, the use of those local applications to which I have just directed attention. It may also be desirable to try the effect of moxas applied over the situation of the frontal nerve, or the trunk of the facial nerve soon after it emerges from the petrous portion of the temporal bone. The veratria ointment may also be rubbed above the eye-brow and beneath the eye-lids, though not so near as to irritate the conjunctiva. I have not used this ointment for the purpose of relieving the pain occasioned by neuralgia of the eye-ball, except in the case of a female whom I saw in conjunction with my friend MR. INGLEBY. In that case the pain was so violent, that it became a question how far it would be proper to perform a surgical operation, and, as all other means had been tried without success, I should certainly have divided the cornea, and discharged the contents of the eye-ball, if the pain had not been relieved by the application of the veratria ointment. It is curious, that as the pain subsided, the eye-ball wasted without any appearance of acute inflammation or suppuration.

We may now and then furnish the patient with a period of relief by directing the mercurial ointment blended with opium to be rubbed above the eye-brow and around the orbit; and as the pain is generally diminished in proportion as the eye-ball becomes atrophied, we may encourage this occurrence by tapping the eye, or more decidedly induce it by dividing the cornea, removing a small portion of its central part, and permitting the escape of the fluid portion of its contents.

## SECTION X.—IMMOBILITY OF THE EYE-BALL.

The eye-ball may be fixed in its socket—prevented from moving—by various causes. In the first place, it may, from a great variety of circumstances which it would be tedious to detail, be so accurately adapted to its socket, that no motion can take place, owing to the resistance such accuracy of adaptation necessarily opposes to the influence of the action of its muscles, and this may be particularly witnessed in some cases of staphyloma and hydrophthalmia. Again, the muscles of the eye-ball may be paralysed, as happened in some of the experiments performed by MAGENDIE, and to which I have several times had occasion to refer. He says "le globe de l'œil lui-même semblait avoir perdu tous ses movemens; l'iris était fortement contracté et immobile; enfin l'œil semblait un œil artificiel placé derrière des paupières privées de mouvement."* Now, in such cases we cannot restore the movements of the globe; and, in the former class of causes, the restoration of its movements will mainly depend on the cure of the more important malady, of which the fixed and immobile state of the eye-ball is merely one of many symptoms; for example, the globe may be fixed in its socket, when much enlarged, as in certain cases of hydrophthalmia, and on puncturing the eye-ball and discharging a portion of its fluid contents, its muscles will then easily perform their office, and the eye-ball will again be moveable in its orbit.

This immoveable state of the eye-ball is described in old books as "the senseless eye," which is, of course, an improper term, inasmuch as the actual sensibility—the sensibility to common, and indeed to every impression except that of light—of the organ of vision remains just as usual, and is not at all impaired.

---

* *Journal de physiologie*, T. iv. p. 177.

also be desirable to try the effect of moxas applied over the situation of the frontal nerve, or the trunk of the facial nerve soon after it emerges from the petrous portion of the temporal bone. The veratria ointment may also be rubbed above the eye-brow and beneath the eye-lids, though not so near as to irritate the conjunctiva. I have not used this ointment for the purpose of relieving the pain occasioned by neuralgia of the eye-ball, except in the case of a female whom I saw in conjunction with my friend Mr. Ingleby. In that case the pain was so violent, that it became a question how far it would be proper to perform a surgical operation, and, as all other means had been tried without success, I should certainly have divided the cornea, and discharged the contents of the eye-ball, if the pain had not been relieved by the application of the veratria ointment. It is curious, that as the pain subsided, the eye-ball wasted without any appearance of acute inflammation or suppuration.

We may now and then furnish the patient with a period of relief by directing the mercurial ointment blended with opium to be rubbed above the eye-brow and around the orbit; and as the pain is generally diminished in proportion as the eye-ball becomes atrophied, we may encourage this occurrence by tapping the eye, or more decidedly induce it by dividing the cornea, removing a small portion of its central part, and permitting the escape of the fluid portion of its contents.

## SECTION X.—IMMOBILITY OF THE EYE-BALL.

The eye-ball may be fixed in its socket—prevented from moving—by various causes. In the first place, it may, from a great variety of circumstances which it would be tedious to detail, be so accurately adapted to its socket, that no motion can take place, owing to the resistance such accuracy of adaptation necessarily opposes to the influence of the action of its muscles, and this may be particularly witnessed in some cases of staphyloma and hydrophthalmia. Again, the muscles of the eye-ball may be paralysed, as happened in some of the experiments performed by MAGENDIE, and to which I have several times had occasion to refer. He says " le globe de l'œil lui-même semblait avoir perdu tous ses movemens; l'iris était fortement contracté et immobile; enfin l'œil semblait un œil artificiel placé derrière des paupières privées de mouvement."* Now, in such cases we cannot restore the movements of the globe; and, in the former class of causes, the restoration of its movements will mainly depend on the cure of the more important malady, of which the fixed and immobile state of the eye-ball is merely one of many symptoms; for example, the globe may be fixed in its socket, when much enlarged, as in certain cases of hydrophthalmia, and on puncturing the eye-ball and discharging a portion of its fluid contents, its muscles will then easily perform their office, and the eye-ball will again be moveable in its orbit.

This immoveable state of the eye-ball is described in old books as " the senseless eye," which is, of course, an improper term, inasmuch as the actual sensibility—the sensibility to common, and indeed to every impression except that of light—of the organ of vision remains just as usual, and is not at all impaired.

---

* *Journal de physiologie*, T. iv. p. 177.

It is evident that the symptoms of protrusion of the eye-ball will vary with the nature and extent of the cause of such protrusion, and that the treatment will be materially influenced by the same circumstance, as well as by the severe or mild character of the symptoms to which it may give rise. I shall speak of the diseases of which the protrusion of the eye-ball is only a symptom, when treating of the morbid affections of those parts under which they are classed. It will be understood, from the preceding remarks, that protrusion of the eye-ball is not always so much a disease *per se*, as a symptom or effect of some other morbid affection.

Sometimes the cause of proptosis is by no means easily made out, I have seen several cases in which very considerable apparent enlargement and projection of the eyes have occurred after fever and after severe pain in the head, without any previous disease of the eyes whatever. A young woman in this town (— WRIGHT) was placed under my care on account of a slight degree of proptosis, which followed an attack of severe pain in the head; the pain had been pretty constant for several weeks before I saw her, attended with something like a slight epileptic attack, at intervals of about five or six days. The cause of the pain was not clearly made out, the pain itself was moderated only after several months of active treatment by bleeding and the administration of mercury, and the proptosis continues in a certain degree—that is, the eyes are prominent, and a very large part of the sclerotica is exposed, so that the young person has a remarkably disagreeable staring appearance.

MR. TRAVERS had a patient under his care where the protrusion of the eye appeared to depend on disease of the antrum. The reporter of the case remarks, that " it is the opinion of MR. TRAVERS, that there is encysted polypous disease within the antrum, which, having gradually increased, has pushed up the orbit, and occasioned an extrusion of the eye."* MR. LAWRENCE mentions the case of a patient in whom partial protrusion of the left eye-ball occurred after erysipelas of the face consequent on fever. By careful management the eye regained its proper position and aspect, and perfect vision was restored.† A child is now in attendance at the Birmingham eye infirmary, in whom there is a considerable projection of the globe, which occurred slowly, and without any ascertainable cause. The lids are much projected, and the conjunctiva appears to be a little bulged between the lower lid and the eye-ball. The eye is a little inflamed, and there is a pretty copious secretion of tears. I suspect there is either a quantity of fluid, or a number of hydatids behind the eye-ball, which is causing the protrusion.

From the preceding observations it will be evident that there can be no one fixed plan of managing these cases of protrusion of the eye-ball—that, in fact, the cause of the malady must be sought for and removed 'ere its effect and symptoms can be taken away. The causes of the affection are, however, sometimes so obscure, it comes on so rapidly and unexpectedly, that we have little else to do but watch the progress of the case, with a view of taking prompt advantage of any circumstance which may occur and throw increased light upon the cause of the disease.

DISLOCATION OF THE EYE-BALL.—The eye-ball may become displaced—pushed without the orbit—from a great variety of causes, some of which have been, and others remain to be, discussed. I shall treat, or have already treated, of the displacement of the eye-ball, in those sections of my work where the causes of such displacement constitute diseases which are to be considered separately from the dislocation of the globe, which, indeed, is often merely one of many symptoms belonging to the more important affection. And, in illustration of the fact comprised in these remarks, I may mention, abscess of the orbital cellular membrane—increase of the orbital adipose structure—tumours in the orbit—enlargement of the lachrymal gland, and many other morbid affections, for all these diseases are frequently attended with displacement of the eye-ball, at some stage of their existence; so that I shall now only consider that form of dislocation which is usually produced by accidentally applied violence.

---

* *Lancet*, Volume xiv. page 91.

† *A Treatise on the diseases of the eye*, page 559.

The eye-ball may be forced from its socket by some form of local injury, such as the introduction of a foreign body within the orbit, and it may either be pushed just without the lids, or it may be almost entirely disconnected from its posterior attachments. In either case the displaced organ should be carefully and promptly returned to its proper situation, which is generally very easily accomplished simply by depressing the lower lid, but should it be at all difficult, the intertarsal slit may be lengthened by an incision at its temporal side with a common scalpel, and every measure should be adopted which is calculated to prevent the occurrence of severe inflammation. There are many cases related, where the eye-ball has been displaced by accident, the muscles and optic nerve being elongated, and, on being replaced, no serious consequences have occurred.

CASE I.—"— COVILLARD, dans ses *Observations iatro-chirurgiques*, dit avoir été appellé pour un homme qui avait reçu à l'œil un coupde balle de raquette, si fort que tout la circonférence du globe de l'œil étoit séparée de l'orbite. Un parent du blessé, tenoit des ciseaux pour couper les parties auxquelles l'œil restoit attaché. Notre auteur entra à temps et fort heureusement pour s'opposer à cette action; et ayant remis, dit-il, l'œil à sa place le plus proprement et promptement qu'il lui fut possible, il suivit la cure: ses soins réussirent si bien, que le blessé guérit sans aucune altération ou diminution de la vûe."*

**MAÎTRE-JAN** has remarked upon this case, that the eye-ball was not dislocated, and that **COVILLARD** mistook the chemosis and ecchymosis, consequent on the injury, for a displacement of the eye-ball. The conclusion of **MAÎTRE-JAN** is not, however, justified, or in any degree borne out the arguments on which it is founded, and his criticism appears to be equally feeble and illiberal.†

CASE II.—"Several years ago I met with an instance of this, in which the eye was almost entirely turned out of the socket by a sharp-pointed piece of iron pushed in beneath it. The iron passed through a portion of the

---

[*] See the "Memoire" of LOUIS "Sur plusieurs maladies du globe de l'œil; où l'on examine particulierement les cas qui exigent l'extirpation de cet organe, et la méthode d'y proceder," in *Mémoires de l'académie royale de chirurgie.* Tom. v. p. 162.—Cases of dislocation of the eye-ball, which were equally successful in their result, are also quoted from LAMSWERDE and SPIGELIUS.

[†] The following curious case is related by BIDLOO:—"Vidi, ante sex annos, *Londini*, virum robustum, cui ambo oculi, horrendum in modum protuberabant: quod ad ipsam partium dispositionem, illam genuinam observavi, præterquam quod ipsis pupilla majuscula, cæsius color et insolita esset cum duritie magnitudo; visu tamen utrumque destitutum omni expertus sum; inquirens in causam, accepi, inter luctandum ab adversario suo, irâ, gymnasticas, vel luctationis anglicanæ, leges excedente, pollices fuisse oculorum orbitis intrusos hominemque mox, nullo inflicto vulnere, dolore correptum summo, non medicis, non chirurgis; sed visu restitisse orbum oculosque magis magisque distendi atque protuberare, quandoque cum, quandoque sine dolore." *Opera omnia anatomico-chirurgica*, p. 173.—VAUGION mentions that "some years since there was a certain man in the Hôtel-Dieu at Paris, who had his eye struck out by a blow which he received, the globe of the eye, being without the orbit, adhered and grew to the cheek, and the optic nerve was elongated, notwithstanding which he could discern any object presented to him." *A complete body of chirurgical operations*, p. 342. London, 1715.

socket, and remained very firmly fixed for the space of a quarter of an hour; during which period the patient suffered exquisite pain; he was quite blind in the affected eye; and the eye-ball being pushed so far out as to give reason to suspect that the optic nerve was ruptured, it was doubted whether it would answer any purpose to replace it or not. As no harm, however, could arise from a trial being made of it, I resolved to make the attempt; and with much pleasure and astonishment I found, on removing the wedge of iron, which being driven to the head was done with difficulty, that the power of vision instantly returned even before the eye was replaced. The eye was now put easily into the socket; and the effects of inflammation being guarded against, the patient enjoyed very perfect vision.*"

The surgical work of MR. WHITE *(Cases in surgery)* contains a case of the same nature, which was equally successful in its result. So that it would be extremely wrong, with a knowledge of these facts, to neglect an attempt to preserve the organ by carefully and promptly returning it within the orbit. After having replaced the eye-ball in its socket, close the lids, and bind lightly over them a linen roller, which may be kept wet with cold water, which is preferable to the goulard lotion, because it does not stiffen the linen as the latter application is known to do. The patient should be kept perfectly quiet in a dark room and placed upon low diet, for we have to guard against, not only severe inflammation of the eye, but of the brain also, and to keep down constitutional irritation, to which there is generally a great tendency. However, if any of these things should take place, that is, either acutein flammation of the eye or of the membranes of the brain, or should any material degree of constitutional irritation supervene, it would be necessary to employ for their removal, the ordinary antiphlogistic and other measures.

---

* *A system of surgery* by Benjamin BELL, Vol. iv. p. 162. Edinburgh, 1801.

### SECTION XIV.—INJURIES OF THE EYE-BALL.

The eye-ball is subject to a great variety of injuries, the greater part of which have been already mentioned, when treating of the different affections of the separate textures of the eye, such as injuries of the cornea, of the iris, of the sclerotica, of the choroid, and so on. Violent blows upon the eye will cause a great variety of affections, such, for instance, as rupture of the cornea and of the sclerotica, and the latter is by far the most common occurrence of the two, and may take place independently of the laceration of the conjunctiva, so that a tumour may be formed upon the eye, covered by the conjunctive membrane, and containing either aqueous or vitreous humor. The choroid and retina may also be ruptured or separated from their connexions to a greater or lesser extent, independently of the laceration of the conjunctiva; the choroid and retina may also be ruptured or separated from their connexions to a greater or lesser extent, independently of any division of the external tunics; and, as has been explained, a blow upon the eye-ball, or severe pressure upon it, will sometimes occasion amaurosis, the former, by producing concussion of the retina, and the latter, perhaps, by occasioning compression of the retina. Of this last form of injury, the following rather curious case is related by **Beer.** "Some years ago" says he "I was called to a man, who had previously enjoyed excellent sight, but, a short time before I saw him, had, in an instant, become totally blind in both eyes. He happened to be in a company of friends, when suddenly a stranger stepped behind him, and clapped his hands upon his eyes, desiring him to tell who stood behind him. Unable, or unwilling, to answer this question, he endeavoured to remove the hands of the other person, who only pressed them the firmer on the eyes, till at length withdrawing them so as to allow the eyes to be opened, the man found that he saw nothing, and continued ever afterwards blind, without any apparent lesion of the eyes."

Severe blows upon the eye-ball may cause the effusion of blood within it, in a greater or lesser quantity, or the dislocation of the lens, and again, the eye-ball is, like other parts, exposed to gun-shot wounds or injuries:—for instance, it may be forcibly struck by the explosion of a quantity of gunpowder, and this may not merely disfigure the eye, by discolouring the cornea and conjunctiva, but may also give rise to amaurosis by the forcible concussion of the eye-ball the explosion may have produced. A small shot, or several shots, may enter the globe, and may give rise to amaurosis, not frequently by injuring any important part, for it may occur although the foreign body entered the eye-ball through the cornea, neither by exciting any active degree of irritation, for it generally becomes encisted; nor by undergoing absorption, for I never remember to have seen a shot, which had entered the eye-ball, reduced in volume in consequence of being partially absorbed. The pressure of the shot upon the retina appears to afford the true explanation of this circumstance, for we have already seen that amaurosis may occur, although the shot may have merely pierced the cornea, may have given rise to no acute inflammation either of the superficial or deep-seated textures, and may not have been diminished in size by the absorbent process. I have many times witnessed the wasting—the complete atrophy—of the globe after an injury of this kind;

for example, a person has called upon me with amaurosis after the eye-ball had been struck with a small shot which had penetrated within the globe, he has, perhaps, been under the care of a surgeon ever since he received the injury, and the sight has been gradually or suddenly destroyed; the eye may be almost perfect in appearance, with the exception of a slight mark, pointing out the place where the shot entered the globe, and the pupil may, perhaps, be enlarged and immoveable. After awhile, the eye-ball has become soft and flaccid, it has wasted, and, without pain or inflammation, has subsided into a small button-like substance similar to that which remains after suppuration of the globe.* And this leads me to remark that, although foreign bodies, when situated within the eye, generally become encisted, and often do not occasion any material irritation, yet, in other instances, they really appear to render the eye irritable and liable to become inflamed from a slight cause—a cause quite inadequate to the production of inflammation in the natural and healthy condition of the organ; and this will mainly depend on the degree of injury which was inflicted at the time such foreign body obtained admission into the eye, the nature of the foreign body, its size, its form, the equality of its surface, the part in which it may be impacted, or to which it may attach itself, and lastly, the constitutional condition of the patient in whom it may take place. However, as a general rule, it is improper to make an incision into the cornea for the purpose of removing any foreign body which may be situated within the eye-ball, unless it is quite manifest on external examination and is evidently producing considerable irritation; for, in nearly all the instances of this kind I have witnessed, where an attempt has been made to remove a shot or some similar substance from the eye-ball, as a means of preventing the occurrence of acute ophthalmia, the operation has occasioned great pain, has produced suppuration of the globe, and the operator has rarely been able to accomplish his intention—to find and remove the foreign body.

---

* I have recently seen an interesting case of this nature with my friend Mr. Spilsbury, of Walsall; a second occurred in the person of a gamekeeper, residing at Solihull, which fully sustains, in all its details, the statement in the text.

When small hard bodies are driven with great force through the cornea, they are sometimes arrested by the lenticular substance, and it appears to me that, although this occurrence necessarily involves, at least the temporary loss of all useful vision, it would be most improper to select the period immediately consequent on the occurrence of the accident, as the proper season for performing a surgical operation. The first measures should certainly be adopted with the intention of preventing the occurrence of inflammation, or of lessening it as soon as it does take place, and, as soon as the ophthalmia is subdued, the opaque lens, in which the foreign body is imbedded, may be removed by a section of the cornea, if there appears to be any increased liability to ophthalmia on account of the presence of the foreign body, or if the subject of the accident wishes to be relieved from the personal defect occasioned by the opacity, &c. of the lens. I willingly admit that circumstances *may* exist which may render necessary the immediate removal of a foreign body which has been impelled within the eye-ball, but I must also admit that such necessity is very rarely present. I have, however, been obliged to remove foreign bodies from the eye-ball long after their admission, for the relief of intense pain, and in all such instances, they have been either floating loosely in the globe or impacted, without being encisted, in its tunics. The extirpation of the eye-ball may be required, when a shot or some foreign body is firmly fixed in the optic nerve, or the posterior part of the sclerotica, and cannot be readily removed by means of a free section of the cornea.

The following case, taken from the *Clinique chirurgicale* of LARREY, affords a pretty good illustration of the extent of injury the eye may suffer, without absolute privation of its functions.

CASE I.—"A serjeant in the Garde Royale received an injury on the left eye, which burst the globe and expelled the crystalline, vitreous, and aqueous humors. The palpebræ were ecchymosed; the conjunctiva red and bloated; and the lower part of the cornea was separated from its attachment to the sclerotic by an irregular cut, through which a portion of the iris protruded. The parts were washed, the iris carefully returned, the edges of the cornea approximated, the eyelids closed, and blood was drawn from the temporal artery. Ice to the head, sinapisms to the feet, constant darkness, and a vigorous diet were enjoined. During the night he was bled again, and next day cupping-glasses were applied between the shoulders. It was supposed that vision would be for ever lost, but *à notre très grande et agréable surprise* the globe gradually refilled; on the 22d day the cornea began to assume a healing aspect, and in about six weeks it was perfectly cicatrized. The natural form, and almost the ordinary volume of the organ, were restored, and by the aid of a very convex glass, this soldier came to see objects distinctly, and continues to discharge all the duties of his office."*

---

* *Medico-chirurgical review.* Vol. xvii. page 486.—CRUVEILHIER (*Essai sur l'anatomie pathologique en general, et sur les transformations et productions organiques en particulier.* Paris, 1816.) refers to the case of a soldier whose eyes were actually frozen, during his retreat from Moscow. The subject of this extraordinary calamity survived the severities he encountered during his retreat.

There is a form of injury termed "evulsion of the eye-ball," which implies the sudden and entire separation of that organ from its various connexions with the orbit. Of course, this is always the result of violent injury, and when the organ is wholly detached from its natural connexions, it is quite absurd to restore it to its former situation, for it will not unite to surrounding parts, and even if it were so to unite, the power of vision would never return. The eye-ball may be separated from its muscles, and torn completely away, or the muscles may be detached from their connexion with the orbit, at the same time. When the eye-ball is, with its muscles, forcibly torn away from the orbit, it would be proper to syringe this cavity with tepid water, close the eye-lids, and employ the usual means of preventing or of combating (as the one or other may be required) inflammation. But, if the muscles of the eye-ball are left behind, the globe being separated from them, it would be prudent to return them within the orbit, (removing, of course, those parts of them which are more particularly injured) syringing the orbit as before with tepid water, and employ the same treatment as in the former case; and I need not enter into the detail of measures such treatment would comprehend. There are many instances of this description in various *Medical Journals*, and among others, the following case, in GRAËFE's *Journal*, is by no means uninteresting, inasmuch as it affords a good illustration of the extent of injury with which this form of accident may be associated, without leading to any serious or fatal consequences, independently of those minor local inconveniences which are necessarily connected with such injuries. It is stated in the work I have mentioned, that a cart wheel passed over the side of a man's head and tore out the eye-ball, along with seven lines length of the optic nerve, the muscles of the eye being left behind, and the orbit uninjured. The patient, a man 75 years old, recovered without a bad symptom. I may, however, remark, that in order to insure so favourable a termination, it will frequently be necessary to employ active depleting and other measures, and I do not enter more minutely into the matter inasmuch as the details of its management will be strictly regulated by the general principles of surgery. The degree and extent of injury—the mischief with which the detachment of the globe may be combined, and the manner in which it may be separated from its natural connexions—will vary in different instances, so that no fixed plan of management (fixed in respect to all its details) can be laid down by an author.

### SECTION XVI.—EXTIRPATION OF THE EYE-BALL.

This operation may be required on account of many diseases, but chiefly for the removal of those of a malignant nature.

The first account of an operation for the removal of the eye-ball was given by BARTISCH in the year 1583, and it appears that he performed it with an instrument somewhat resembling a spoon with a cutting edge, so that we are assured the eye was rather scooped out than carefully and properly detached from its connexions. Thirteen years afterwards, HILDANUS substituted for this instrument, a slightly curved knife with a blunt extremity. Since that period, various instruments have been devised, changed, and modified according to the fancy of the inventor, but, instead of enumerating them, I will proceed to point out what was once considered a great improvement in the method of extirpating the eye, which was first mentioned by Louis,* and afterwards adopted by Sabatier. He proposed that, instead of cutting through the parts connecting the eye-ball to its socket by continuous sweeps of the knife, the muscles of the globe should be divided separately, and that the direction and position of the instrument should be changed with the respective seat of the muscle about to be divided; but this proceeding is quite unnecessary, and, in many instances, cannot be carried into effect, in consequence of the changes the parts within the orbit have undergone from the long continuance of the disease. So that this theoretically excellent plan—this specimen of surgical refinement—is, for the most part, practically useless. Desault advised that, in order to permit the more extensive separation of the eye-lids, an incision of about half an inch in length should be made at their temporal angle continuous with the intertarsal slit, and this must be considered, by every one who reflects upon the subject, a very important improvement upon the former method of performing this operation.

The instruments generally used at the present day in accomplishing the extirpation of the eye, are, a small straight scalpel, to divide the integuments at the outer angle, and also to divide that portion of the conjunctiva where it becomes reflected from the lids to the globe; a curved knife will also be required, with a pair of curved scissors, a needle and ligature. The knife to which I refer, should be curved laterally, so that when dividing the posterior connexions of the eye-ball, the convex surface of its blade may be opposed to the concavity of the orbit.

---

* He has described his method of operating with the most circumstantial minuteness, in the fifth volume of the *Mémoires de l'académie royale de chirurgie*, and has, at the same time, given a complete history of the mode of extirpation of the eye-ball from the earliest period at which it was performed to the time at which he wrote (1744). Those who are anxious to acquire a full knowledge of the literature of this subject—to obtain, in a condensed, yet sufficiently elaborate form, a description of the various improvements suggested by succeeding surgeons, and of the diseased states of the eye to which they considered the operation to be adapted—may advantageously refer to M. Louis's laboriously compiled "Mémoire sur plusieurs maladies du globe de l'œil; où l'on examine particulièrement les cas qui exigent l'extirpation de cet organe, et la méthode d'y procéder."

*Position of the patient.*—I think it better that the patient should be placed as for the operation of extraction—that is, lying upon the back, with the head slightly raised, for in this way we insure steadiness and quietude on the part of the patient, and possess full and convenient command over the part upon which we are about to operate. It is also adviseable to apply a bandage over the opposite eye, to prevent the spasmodic movements to which it will otherwise be exposed during the operation.

*Operation.*—The surgeon must first divide the skin at the outer angle of the eye with a common scalpel, varying the length of the incision, in accordance with the magnitude of the organ about to be removed, from three to twelve lines. Then pass a curved needle, armed with a strong ligature, through the cornea or through the sclerotica on both sides, and having the lids well separated by an assistant, take hold of the ligature, and draw the eye steadily and firmly forwards and upwards, whilst the conjunctiva is divided at its lower part, and then, pulling the eye slightly downwards, cut through the conjunctiva in a similar manner at its upper part, and having done this, first separate the muscles of the eye-ball at its lower and lateral parts, and then, pulling the globe downwards, detach, with the same instrument, those at its upper part, and lastly, the optic nerve, taking care to remove, at the same time, every part contained in the orbit as near to the bone as possible. When the eye-ball is *nearly* detached from its connexions, it ought not to be pulled forcibly, lest they should be torn, and the patient thereby sustain a needless degree of pain and injury. There is no difficulty whatever in extirpating the eye, unless, indeed, the disease, on account of which the eye is removed, has induced induration of the orbital cellular texture, and adhesion between it and the orbital periosteum. The concave surface of the knife will be opposed and adapted to the surface of the eye-ball, and its convex side to the concavity of the orbit, whilst its point will be sufficiently long and curved to divide, without any difficulty, those parts which are placed immediately behind the globe.* The eye-ball is now removed from the orbit, and the ophthalmic artery and other arterial branches may bleed pretty freely, but unless they be materially enlarged, or unless there be a decidedly hæmorrhagic tendency, either of a local or general character, there is no urgent necessity for the adoption of any measures for the purpose of suppressing it. The orbit may be injected with cold water, and the blood washed away so as to permit a clearer view of the state of the orbit, and the finger should also be introduced, so as to ascertain whether or not any indurated mass of cellular membrane or other diseased structure remains behind, and if no such indurated cellular texture remain, and if the lachrymal gland be removed, the hæmorrhage from the ophthalmic artery may be suppressed, if necessary, by the following means:—Take a small pad of soft lint, and apply it to the mouth of the bleeding vessel, and place upon this another pad still larger, and a third, and, indeed, as many as may be required (gradually increasing their size) to fill the orbit but not to distend the lids, and apply over them a narrow roller—in this way the bleeding may be effectually controlled; or it may be as securely checked by rolling a piece of lint in a conical form, and applying its smaller end to the bleeding point or surface. But there may be no occasion to fill the orbit with lint, for the hæmorrhage may either cease spontaneously, or may have been suppressed by injecting the orbit with cold water, and, in such case, it is far better to omit the introduction of any foreign body within the orbit. I should have stated, that prior to the introduction of the lint, it should be well soaked in oil to prevent the occurrence of any difficulty in removing it whenever such removal is deemed desirable.

---

* It is an advantage to have two curved knives, that is, the one I have just mentioned, and another, which is only slightly curved at, and for a very short distance from, the point, for the purpose of dividing the optic nerve and the absolutely posterior connexions of the eye-ball; the other knife, which is gradually and slightly curved from its heel to its point, is particularly required for the division of its more lateral attachments.

If the skin at the external angle of the eye has been divided as a preliminary step to the removal of the diseased organ, (which, of course, is only necessary when the eye-ball is morbidly enlarged,) the edges of the wound should be brought together by means of a suture introduced very near to the external angle; the eye-lids should be gently and carefully closed, a thin fold of linen wet with cold water should be placed upon them, and supported in its situation by a narrow roller, passed lightly round the head. The patient should be placed in bed, with the head and shoulders much raised, and allowed only a spare, cool, unstimulating diet, and the part should be kept constantly moistened with cold water; for these measures are absolutely necessary to diminish the extent of local inflammation, and of general febrile irritation. As the upper surface of the orbit is remarkably thin, and forms a part of the floor upon which the cerebral substance rests, it is evident, that unless the point of the knife be very carefully placed and managed, the bony texture may be fractured, and very serious injury inflicted; and, on this account, I should recommend every surgeon who performs this operation, to have the knife carefully curved from its heel to its point, and to take care that it is double-edged for a certain distance from the point, and not exactly spear-shaped but becoming pretty suddenly about a quarter of an inch broad, which breadth it should retain to its heel. Where the orbital adipose and cellular membrane are diseased and indurated, and pretty firmly adherent to the orbital periosteum, I should advise that, rather than incur the risk of breaking the bone by an attempt to remove the whole of the disease at once, the morbid structure should be cut through near to the bone, and that it be carefully removed (even piecemeal, if that be necessary to secure its safe removal) afterwards. This method of procedure does not involve the slightest risk of leaving any part of the disease behind, for the bony walls of the orbit may be even better freed and cleared from any adherent morbid matter by this plan of operating than by attempting to take away every part of the diseased mass at once.

If any foreign body has been introduced within the orbit immediately after the operation for the purpose of suppressing hæmorrhage, it may be removed on the following day, and the orbit again injected, the eye-lids should be then closed, and the bandages re-applied; and it is of the highest degree of importance that the utmost quietude should be preserved, that the patient's apartment should be darkened, that the bowels should be opened by mild, unirritating laxatives, that the diet should be of the most spare and unstimulating quality, and, in short, that every measure should be employed which is calculated to lower to a certain extent, and to tranquillize the system.

In a few days a slight degree of suppuration will occur, perhaps the eye-lids may be a little tumid, the system may be somewhat feverish, and there may be a trivial degree of uneasiness in the head; and, in favourable cases, these symptoms may subside in the course of a week or nine days; and, on inspecting the orbit a fortnight after the operation, its interior will be found to be more or less irregular, with, also, a small discharging surface at the bottom of the orbit, in the situation of the optic nerve. This is the most favourable view of the subject, and when it has taken so desirable a course, and when parts are in this state, they will soon be in a condition to permit the use of an artificial eye, which, although it will not correspond in its movements with that of the opposite side, will at least support the lids, and afford a more agreeable appearance than that presented by the sunken unsupported palpebræ. I need scarcely remark, that the removal of the muscles of the globe, and the absence of that tubercle which, under other circumstances, remains attached to them, prevents those movements of the artificial organ which are so well accomplished when the artificial eye is placed upon an eye-ball which is merely in a state of collapse. However, many patients who have suffered the extirpation of the globe, cannot wear an artificial eye; it either excites great uneasiness; or the union of the section at the outer canthus may so shorten the intertarsal slit, or prevent the lids from being well separated, that it is exceedingly difficult to introduce an artificial eye, or otherwise the under surface of the palprebæ may become adherent to the bone, or so drawn inwards, that it would be quite impossible to introduce a proper artificial eye within the orbit.

However, severe inflammation may arise after the extirpation of the eye, the lids may swell and inflame, the cavity of the orbit may yield a very free secretion of pus, the system may be rendered excessively irritable, and the brain may become more or less affected. If such a state of things should occur, active local and general depletion may be required; the orbit should be freely injected with warm water; the eye-lids should be frequently fomented with poppy water, and every measure should be adopted which is calculated to remove existing symptoms, and diminish the risk of the occurrence of inflammation of the brain and its coverings, for death has taken place in several instances after extirpation of the eye-ball, from this canse alone. And this fact must be borne in mind in representing to the friends of patients the advantages and disadvantages connected with this operation—the hazards, as well as the benefits its performance may involve; for, it cannot be denied, that the best and most judiciously employed measures will not, at all times, enable us to divest this operation of so calamitous a result. Sometimes the palpebræ will be so much swollen and inflamed, that their size will be quite enormous, their colour dark and almost purple, as though they were about to slough, and their veins enlarged and much distended; and unless something be done to relieve this state of things, not only will the patient's sufferings be needlessly protracted, but the vitality of the lids will be destroyed—they will slough. Whenever the eye-lids are in this state, I am in the habit of directing that they be well bathed with water, made as hot as can be conveniently borne, and then, selecting one or two of the most prominent veins, I puncture them with a fine lancet. The blood which first flows, comes away very slowly, and it is of a very dark colour, but, by continuing to foment the part, the bleeding becomes much more free; and we may generally remove in this way, a large quantity of blood, so that the lids will be rendered flaccid, of a paler colour, and much reduced in size:—neglect in this particular, has, to my own knowledge, caused sloughing of the eye-lids to take place.

I should have said, that the disease for which the extirpation of the eye-ball is undertaken, may have affected the lids more or less extensively, and, in such instances, it is desirable to remove them at the same time, to an extent varying with that of the disease, always taking care that a larger portion of the palpebræ is removed than is discovered to be actually involved in the particular affection, for the cure or relief of which such removal is deemed necessary.

In the course of the treatment, it may be judged adviseable to use stimulants, to repress flabby granulations, to quicken the healing process, and so on; and it is said that benefit has resulted from the occasional injection of the orbit with a weak solution of the sulphate of zinc, but I am convinced that such applications should be used with extreme caution, and should be generally altogether avoided.

It is well known that the nerves of a stump become enlarged and bulbous at their extremities, and the chief object of this enlargement appears to consist in the protection their exquisitely sensible structure derives from the increased deposition of which this particular enlargement is composed. The new deposition is not an acutely sensible structure, sudden and violent impressions upon it are not followed by that excess of suffering which a similar degree of local injury or of impress would produce upon nerves in their healthy state, and possessing their natural degree of sensibility. This, then, appears to be the reason why the extremities of nerves become enlarged and bulbous when divided under circumstances such as exist after the amputation of a limb. But does the same thing occur in the nerve of the eye? Does the extremity of the optic nerve become enlarged and bulbous after the extirpation of the eye-ball? I regret that it is not in my power to furnish a satisfactory reply to this question, for, although I have certainly examined the state of parts after the death of individuals who have suffered the extirpation of the eye-ball, yet, in the few cases in which such opportunity of instituting the necessary examination has been afforded me, the disease, for the cure of which the operation was undertaken, had so altered and implicated the optic nerve that no satisfactory conclusion, with respect to this fact, could be formed. However, I am inclined to think that the extremity of the optic nerve is not enlarged after the extirpation of the eye-ball, in the same way as the extremities of the large nerves are increased in size after the amputation of a limb, and I entertain the belief mainly because the parts within the orbit are less exposed to injury from without than is the extremity of an amputated limb, the nerves of which are placed near to its surface, which is, of course, liable to receive frequent injury, or at least rather rough usage. In one instance where the eye had been extirpated, the extremity of the optic nerve was absorbed, and had retreated a little within, or, at least, did not project beyond the optic foramen, and it was not at all enlarged by any adventitious deposition. I apprehend that absorption of the ocular extremity of the optic nerve nearly to the point of decussation, usually occurs after extirpation of the eye-ball; but I am not prepared to state this at all positively from any sufficiently satisfactory experience derived from post-mortem examination. Perhaps this circumstance will be chiefly regulated by the mode in which the operation is performed—if the optic nerve be divided *close to the optic foramen*, it will probably be retracted, if separated *nearer to the eye-ball*, it may become bulbous at its extremity, acquire adhesions to surrounding parts, and remain permanently attached to the bottom of the orbit.

# CHAPTER XVIII.

## MISCELLANEOUS AFFECTIONS OF THE EYE.

### SECTION I.—INFLAMMATION OF THE EYE OCCURRING AFTER FEVER.

Inflammation of the external and internal tunics of the eye sometimes follows severe attacks of fever, and particularly those of a typhoid character. The frequency with which this affection of the eye succeeds the subsidence of the febrile symptoms, would lead us to suspect that the inflammatory condition of the organ of vision resulted rather from an altered quality of the blood, than from an impaired state of health produced by the more important malady.

The forms of disease of the eye consequent on fever, are various.[*] Sometimes the iris and cornea are more particularly affected; sometimes the posterior tunics, the retina and choroid, are more especially implicated; very frequently, purulent matter is deposited between the lamellæ of the cornea, or within the anterior chamber. Suppuration of the eye-ball, or extensive depositions of pus within its cavity, also occasionally take place after fever, as I have previously mentioned. It is impossible to describe the symptoms of inflammation of the eye consequent on fever, without repeating the description of particular forms of ophthalmic inflammation of which I have already treated; so that I have little to mention upon the subject, except to express my own conviction, that the malady is not, as has been represented, always characterized by the same appearances and symptoms, but that they vary, just as one or other of the textures of the eye may be first and chiefly involved in the inflammatory mischief.

---

[*] Dr. Jacob has pointed out the frequent occurrence of ophthalmitis after typhus fever, which, he says, never, under his observation, took place in more than one eye. His experience is singular in as far as it represents the disease of the eye, like the malady it succeeded, as being always of the same kind, and characterized by the same symptoms. *Transactions of the association of fellows and licentiates of the King and Queen's college of physicians in Ireland*, Vol. v. p. 428.

In some cases, the affection of the eye commences just as the febrile symptoms decline, more commonly the ophthalmia occurs a few weeks afterwards, and DR. JACOB mentions, that " the inflammation of the eye, in the majority of the cases seen by me, made its appearance within six weeks or two months after recovery from fever; in some instances, however, it appeared before the patient left the hospital, and in others, not for four, five, or even eight months."

In every case of this nature, it is necessary to make a very careful examination of the eyes, in order to detect, not only the extent of parts inflamed and the degree of inflammation present, but also the particular texture which alone may be inflamed, or which may be inflamed in the most considerable degree. Thus it may happen, that the retina may be acutely inflamed, whilst the iris may be scarcely at all affected. I apprehend it is from the desire of generalizing too much, and from a neglect to point out the varieties of the malady, as occurring in different individuals, that we have received such different statements, in respect to treatment, from those who have furnished us with the best and most elaborate descriptions of it. For instance, DR. REID and MR. WALLACE state, that they "have found small doses of Peruvian bark, the most efficacious remedy;"* whilst Dr. Jacob remarks, "in my own practice, I have found the relief from the use of mercury so certain and decisive, that I have trusted to it almost exclusively, with the assistance of the belladonna."† I have seen no reason implicitly to adopt either of these conclusions; the condition and character of the constitution of the individual affected, the violence of the inflammation of the eye, and the particular texture chiefly or solely affected, constitute the circumstances, which ought, in my opinion, to determine the nature of the treatment to be adopted.

## SECTION II.—INFLAMMATION OF THE EYE CONNECTED WITH, OR CONSEQUENT ON, CHOLERA.

The inflammation of the eye, connected with, or consequent on, cholera, in those cases where extensive lymphatic deposition has taken place between the lamellæ of the cornea, and even where suppuration of the eye-ball has eventually occurred, has never been severe, or characterized by much pain. The pus has appeared to be secreted, or the lymph deposited, by a process of mild, and almost painless inflammation, just as may be occasionally noticed in the eyes of young children; in them I have sometimes observed, that when the health is breaking up from various causes, when much emaciated, and particularly when suffering from hydrocephalus, the anterior chamber has become partly filled with pus, which may, or may not, be removed; but occasionally, in spite of the most cautious treatment, the pus will collect in very considerable quantity, will distend, and eventually cause ulceration of, the cornea, and produce collapse of the eye-ball; and all these events have occurred without having been preceded by any acute inflammation of the eye, as indicated by severe pain, great vascularity, and so on.

---

* *Transactions of the association of fellows and licentiates of the King and Queen's college of physicians in Ireland,* Vol. v. p. 294.

† Ibidem, page 476.

It is difficult to lay down any fixed plan of treating cases of this nature; as a general rule, however, tonics, and especially the sulphate of quina, appear to be best calculated to produce relief.

## SECTION III.—INFLAMMATION OF THE EYE CONSEQUENT ON PARTURITION.

I have been called to a few cases where a certain degree of inflammation of the eye has taken place after delivery. The inflammation has been variable as to its degree, and the particular texture inflamed. When the eye has become inflamed after the system has been enfeebled by copious uterine hæmorrhage, chemosis has appeared at an early stage of the ophthalmic affection, with ulceration and impaired vitality of the cornea, and, very generally, subsequent suppuration of the globe; but, in two instances, the use of tonics appeared to prevent the further secretion of pus, and to preserve the form, though not the function, of the organ of vision. The affection of the eye consequent on uterine phlebitis, has eventually constituted the true suppuration of the eye-ball of which I have already treated.

CASE I.—MRS. WRAGG, æt. 35, the wife of a butcher residing in the neighbourhood of Birmingham, miscarried when only four months pregnant. A good deal of flooding followed the miscarriage, which reduced her to a very feeble and precarious state. At this period the right eye became slightly inflamed; the conjunctiva was a little injected, there was a good deal of chemosis, but not much lachrymation, pain, or intolerance of light. In a few days there was a distinct secretion of pus in the anterior chamber, which soon increased so as nearly to conceal the iris. By the use of a few grains of mercury and Dover's powder at bed-time, with a small quantity of the sulphate of quinine, taken three times a-day, the pus became absorbed, and a certain degree of vision was restored.

## SECTION IV.—ANOMALOUS FORMS OF INFLAMMATION OF THE EYE.

The following cases are among a few of many examples of ophthalmic inflammation which I have witnessed in the course of my practice, and which I scarcely know how to arrange under any of the inflammatory maladies of which I have previously treated.

CASE I.—Maria WARING, æt. 50, has suffered from an inflamed state of the right eye for about a year and a half. She has ceased to menstruate five years. Her health is usually very good.

*Appearance of the eye.*—Pupil rather small, and drawn a little upwards and outwards; just behind the corneo-sclerotic junction at the upper and outer part of the eye, the sclerotica is a little projected and of a bluish-red appearance:—the redness appears to be occasioned partly by an arrangement of vessels within the sclerotic texture, and partly by the intense vascularity of some substance beneath it; whilst the bluish appearance of the membrane would seem to depend on its attenuation by which the tinge of the texture beneath is perceived. A few very much enlarged and somewhat tortuous sclerotic and conjunctival vessels are seen to pass from the periphery of the eye-ball towards the projected and vascular substance, which is situated just behind the border of the cornea, and which curves in accordance with the figure of the part around which it is situated. This prominent, curved, and vascular body passed round about one third of the corneal margin.

Sometimes the eye is quite free from pain, and then the external inflammation is scarcely perceptible. Sometimes the inflammation is suddenly much increased, and, at such time, there is, in addition to the appearances previously noticed, a faint vascular zone around the cornea. These renewed attacks of pain and inflammation generally occur at intervals, varying from one to two months. During the severity of the suffering, and so long as the augmented inflammation remains, there is pain above the eye-brow, upon the cheek bone, and towards the nose, sometimes passing to the whole side of the head and face. There is also some intolerance of light, lachrymation, and occasionally, during an unusually severe paroxysm, there are scintillations, and once or twice, when the muscles of the eye-ball have appeared to be affected with spasm, she has seen double. There is great soreness and tenderness of the eye-ball for some days after a paroxysm of pain and a recurrence of inflammation.

*Treatment.*—The plan of treatment first adopted consisted in the employment of mercury and the use of counter-irritation. By these means, the inflammation was quite taken away, but it recurred afterwards just as though no treatment whatever had been adopted. The use of the vinum colchici was attended with the same result. She afterwards took the carbonate of iron, in pretty large doses, with the effect of reducing the inflammation and rendering the attacks much less frequent; but no plan of treatment hitherto adopted, has had the effect of entirely removing the complaint. The eye is still liable to attacks of inflammation, which are characterized by the symptoms previously enumerated, though in a much milder degree. The sclerotica is a little projected and vascular at its upper and outer part and immediately behind the cornea; the most prominent part of the projection having a blue appearance. The cornea is a little opaque at its margin, near to the slightly bulged sclerotica.

This case appears to me to resemble partial inflammation of the corpus ciliare, more nearly than any other disease of the eye, with which I am acquainted.

CASE II.—Joseph RUDGE, æt. 41, a gardener, residing at Wolverhampton, called upon me under the following circumstances. The vision of the right eye was nearly destroyed by an inflammation from which he had suffered for many years, and which, for about fifteen months, had affected the left eye. He says that the inflammation came on very slowly, was accompanied by scarcely any pain, redness of the eye, or intolerance of light; that the sight became gradually impaired; and that the treatment adopted did not appear to check, or in any way interfere with, the progress of his complaint. His health was good prior to the occurrence of disease of the eyes; and he is unacquainted with any cause of the ophthalmic affection, unless it was occasioned by being a good deal in hot and green-houses attending to his flowers and vines.

*Appearance of the right eye.*—The cornea is cloudy, but not vascular, at its lower and outer part, as though an opaque membrane were firmly attached to its surface. It is also slightly raised upon the sclerotica, as if it were unduly prominent. The iris is rather remote from the under surface of the cornea, it is healthy in appearance, except that it is somewhat puckered towards its ciliary margin. The pupil is scarcely at all influenced by varying degrees of light, but it is circular, and its margin is fine, and delicate, and definite in its outline. The sclerotica has a pretty general tinge of redness, a few of its vessels and also those of the conjunctiva pass as considerable trunks from the periphery of the globe towards the margin of the cornea, where they terminate or are lost in a reddish projection, which passes around about two-thirds of the edge of the cornea. This projection gradually tapers off towards its extremities, until it becomes lost in a sort of vascular zone which surrounds the remaining part of the corneal margin. The sclerotica appears to be raised and attenuated by some substance beneath it, which I conceive to be a part of the ciliary body enlarged from inflammation or under some other condition of disease.

*Appearance of the left eye.*—The cornea appears to be somewhat prominent, and rather more remote from the iris than it ought to be; there are also one or two nebulous spots at its lower and outer part; and just behind this portion of the cornea, but not actually in contact with its margin, there is a very trivial projection of the sclerotica. This part of the selerotica is very vascular, there are an infinite number of vessels—very minute vessels—ramifying upon, and within its texture; and from this point there is a faint vascular zone, extending for a short distance along the corneal margin. The iris, and its pupillary margin are healthy; but the pupil is scarcely so active as it ought to be. The surface of the eye is very vascular; this vascularity chiefly consisting of enlarged sclerotic vessels. Under the use of certain remedies the eye became nearly pale, and the selerotic projections so much diminished, that I fancied my treatment was remarkably successful; but, quite unexpectedly, he called upon me again to say that the eyes were nearly as bad as ever.

At this time, I placed a small seton in each temple, and directed him to take a quantity of calomel and Dover's powder until the mouth became quite sore. In about a week, pretty severe ptyalism was produced, which was maintained, by the administration of smaller doses of mercury, for a fortnight. From this period, the eyes gradually amended; the redness of the left eye was nearly removed, except at the projected parts of the sclerotica; the sclerotic bulgings were lessened in size; and vision was restored, so as to be, as he expressed it, as good as ever. This condition of things continued for about two months, when he again called upon me to direct my attention to a small pustule just at the corneo-sclerotic junction, and very near to the little vascular bulging which remained after the use of the mercury; and also to a blush or superficial redness of the eye, which, he said, distinctly indicated the recurrence of his former attacks of inflammation. In this opinion he was, in a few days, found to be but too correct. In this state of things, I directed him to have a seton made at the back of the neck in addition to the maintenance of a free discharge from those he already had in the temples, and to take the vinum colchici until the inflammation subsided. By a continuance in this plan of treatment, for a few weeks, the ophthalmia was quite removed. The attacks of inflammation still occasionally take place; but by the use of the colchicum they are always removed, and it appears to me, that his sight has been continued to him for some time past, solely by having prompt recourse to this medicine. He has quitted his former occupation, and now earns his living as a milkman.

This case appears to me to be one of inflammation of the corpus ciliare, and resembles, in many respects, that I have previously related. It is certainly not one of iritis, for the colour of the iris is unchanged, there is little pain and intolerance of light, there is no effusion of lymph, no proper zone around the whole of the corneal margin, and the pupil is perfectly circular, its outline being quite natural. It more nearly resembles choroiditis, but if it were an example of the latter disease, the pupil would not be clear, the eye-ball would be unduly tense, vision would be more seriously impaired, and there would not be that peculiar and gradual elevation of the sclerotica just behind the corneal margin, at a stage of the disease unattended with any material imperfection of sight, pain or tension of the eye-ball, and cloudiness of its humors. The symptoms would appear to belong to, and to be produced by, acute inflammation of the corpus ciliare, rather than by chronic enlargement of that body, which, I am satisfied, may exist partially or generally, and may only give rise to inconvenience by deranging the action of the pupil, by projecting its ciliary margin towards the cornea, by exciting deep-seated inflammation, or, by destroying the accuracy of adaptation naturally subsisting between the palpebral and ocular surfaces, occasioning a degree of irritation adequate to *cause* the phenomena observed in the case of MR. RUDGE. It will be noticed that, in the preceding example, the inflammation of the eye recurred very frequently, and apparently without any sufficient cause; and that when the sight of the right eye became nearly destroyed, the other was affected in a manner so precisely similar to the right eye at the commencement of disease there, that he is satisfied it was taking exactly the same course. This frequent relapse of inflammation, and affection of one eye after the sight of the other has been nearly destroyed by the disease, is not, however, peculiar to the case of MR. RUDGE, for, in other instances which have fallen under my care, very similar in all essential points of their history, the same circumstances have been noticed.

Case iii.—Miss W——, æt. 19, residing at Edgbaston, called upon me with a friend complaining of slight uneasiness of the right eye. On a careful examination of the eye, I found that there was a very trivial bulging (not a pustule) just behind the corneal margin at its upper part, into which a few enlarged sclerotic vessels passed and appeared to terminate. For a short distance on either side of this trivial bulging, there was the faintest possible indication of, or, if I may be allowed the expression, attempt at the development of, a vascular zone. In other respects the eye was perfectly natural, and the disease was attended with very slight uneasiness, and with scarcely any lachrymation or intolerance of light. I suspected the nature and obstinate character of the case, and at once explained my views and apprehensions to her friends, who, having fancied there was scarcely any thing the matter with the eye, expressed the greatest astonishment at my communication. I only mention this circumstance to prove that the characters of the disease, even when in an incipient state, are sufficiently well-marked to enable any surgeon who has paid much attention to ophthalmic maladies, to recognize them, and to predict the probable obstinacy of the complaint.

The disease had come on after the health had been impaired by an attack of fever; but although this young lady has always been in a somewhat delicate state of health, the condition of the uterine system has been quite as it ought to have been.

The treatment I adopted when I first saw the case, chiefly consisted in the use of goulard water to the eye, and the administration of the carbonate of iron. These measures were continued for about nine days, during which period the eye became much worse—that is, the sclerotic redness was increased, an additional bulging of the sclerotica, at the corneo-sclerotic junction at its upper part, was perceived, with one or two nebulous spots of the cornea. There was also a good deal of intolerance of light, but the eye was not at all painful unless she attempted to read small print or much exert it by artificial light. At this period I prescribed small doses of calomel and opium so as gradually to affect the mouth, with the effect of curing the eye completely as we supposed. However, in a few days a little pustule appeared at the margin of the cornea, and all the former symptoms speedily recurred. I again recommended mercury in combination with opium so as to make the mouth very sore, and I took care to continue the affection of the mouth for many days by the administration of mercury in small doses. The symptoms again subsided, and the eye appeared to be nearly in a healthy state. In about a fortnight a new attack of inflammation was ushered in by the formation of a similar pustuliform body at the edge of the cornea. On this occasion I prescribed the vinum colchici, which had the same effect in removing the inflammation as the mercury, but it was necessary to continue its administration for some time in order to keep the eye quite free from inflammation. At the time I commenced the use of colchicum, I also prescribed a zinc collyrium (two grains of the sulphate of zinc to an ounce of water) with which the eye was to be bathed several times during the day.

*Present state of the eye.*—A few of the sclerotic vessels are somewhat enlarged; there is still a slight bulging just behind the margin of the cornea which extends around about a sixth of its circumference. This bulging is most distinctly perceived when looking at the eye in profile, it is seen to be rather vascular, at least, there is a sort of net-work of vessels dipping deep into the sclerotic texture in that situation, the neighbouring part of the sclerotica has a faint blue appearance, and the cornea is nebulous at one or two points. The pupil of the eye is perfectly natural, the iris is not discoloured, but its ciliary border is a little pushed towards the neural surface of the cornea.

The three preceding cases agree in many particulars: —1, the mode of commencement was pretty much the same;—2, the local symptoms were very similar;—3, one eye only was attacked at the same time;—4, the disease evinced a great propensity to relapse;—5, the appearance of the eye was subject to considerable variations, so that at one part of the day the eye has been nearly pale, and, at another, very red;—6, the disease was not characterized by much pain;—7, the morbid effects were as nearly alike as possible.

In respect to the effect of remedial agents, however, they certainly did *not* agree; for, in the case of Maria WARING, the carbonate of iron was most serviceable; in that of Joseph RUDGE, and MISS W ——, the vinum colchici was chiefly beneficial.

It is a question whether or not the three foregoing cases were of the same nature—whether or not the disease was, pathologically one and the same. I have myself, no doubt, but that the disease commenced and existed in the same part in all of them; and that that part was the corpus ciliare. In fact, either the ciliary processes, or the ciliary body must have been the seat of the disease, and I am not prepared to say, from evidence derived from post-mortem examination, that it was the latter rather than the former; but it has always happened under my own observation, that where the ciliary processes have undergone any material and manifest change (as observed on examination after death) in consequence of inflammation, the disease, even though its precise nature may have been undetected during life, was attended with tension of the eye-ball, muddiness of the pupil, and, if unarrested, was eventually characterized by the symptoms of choroiditis.*

## SECTION V.—HYDATIDS AND VARIOUS ADVENTITIOUS AND PARASITICAL BODIES IN THE HUMAN EYE.

The subjects comprised in this section have recently been elucidated by Mr. Lawrence,† who, in addition to some interesting remarks of his own, has collected and condensed from the writings of Breton, Twining, Nordmann, Leuckhart, Gescheidt, Ammon, Soemmerring, Logan and Mackenzie, all the really valuable information we possess in reference to these singular affections.

Worms of various kinds have been found beneath the conjunctiva (Schön, Gaertner, Rhind), within the chambers of the eye (Gibb, Breton, Twining, Nordmann), and also within the lens (Nordmann, Gescheidt, Ammon) and in the Morgagnian fluid (Nordmann.)

The following case of a living *cysticercus* found in the anterior chamber of the eye, is quoted by Mr. Lawrence, from the work of Dr. Nordmann.

" A living *cysticercus* of the size of a vetch, was formed in the anterior chamber of the left eye of a girl eighteen years old, and otherwise healthy. It was said to have shown itself after an acute inflammation of the organ. I saw, and delineated it, two months afterwards, when no trace of inflammation remained, excepting a slight blush of red round the cornea, on excitement of the organ. It caused no pain, or merely a transient uneasiness when it moved considerably; and interfered with the sight only when it came before the pupil. Usually it lay at the bottom of the anterior chamber, like an imperfectly dissolved lens, where it appeared as a partially transparent sphere, from which there was, at one point, a milk-white opaque prominence. In this situation the thick wrinkled portion of the neck occasionally projected, sometimes spontaneously, sometimes in consequence of gently rubbing the upper eye-lid. Then slowly came out the thinner thread-like half, ending in a head with four suckers, and a double circle of hooks. The body of the animal changed its figure, more or less quickly, from the ordinary globular to an oval or pyriform shape. It generally lay half a line from the margin of the cornea, on account of the narrow interval between the two parts at their circumference. The neck hung downwards like a leaden plummet; it was not attached, but moved freely, and changed its position according to the movements of the head, always passing downwards. In the course of seven months it had become twice as large as when first observed, and had attained the magnitude of a pea, when it was extracted alive by DR. SCHOTT, through a small incision of the cornea. It was put in lukewarm water, and continued to move more than half an hour; it then became gradually opaque and white, and we could plainly distinguish with a microscope the four prominent suckers with their orifices, and the double circle of hooks in the middle of them. As it corresponded in all respects, not only with the delineations of GÖZE and BREMSER, but with other similar specimens from the human body, which

---

* I am now referring to those few instances of inflammation of the ciliary processes, in which the disease was unusually acute, and had produced a manifest change, not only in them, but also in the choroid coat. The opportunity of examining cases of this nature after death, occurs, however, very rarely indeed.

† *A Treatise on the diseases of the eye.* Page 666.

I compared with it, I could have no hesitation in considering it as a *cysticercus cellulosæ*, which, so far as I know, has never been observed in the human eye, although, according to VAN DER HOEVEN, it is found in that of the pig."

The succeeding account of a "living *cysticercus* in the anterior chamber," is given by MR. MACKENZIE.*

"The subject of this singular disease, a lively, healthy girl, of seven years of age, was presented at the eye infirmary on the third current, and the accuracy of MR. LOGAN's account fully recognized by a great number of observers.

"It would appear, that, from the month of August till about the middle of January last, when she was first brought to MR. LOGAN, this child had suffered repeated attacks of inflammation in the left eye. MR. L. found the cornea so nebulous, and the ophthalmia so severe, that he dreaded the total loss of sight. He treated the case as one of strumous ophthalmia; and after the use of alterative remedies, and the application of a blister behind the ear, the inflammatory symptoms subsided, leaving, however, a slight opacity of the lower part of the cornea. After a week, the child was again brought to MR. L. who, on examining the eye, discovered, to his great surprise, a semitransparent body, of about two lines in diameter, floating unattached in the anterior chamber. This body appeared almost perfectly spherical, except that there proceeded from its lower edge a slender process, of a white colour, with a slightly bulbous extremity, not unlike the proboscis of the common house-fly. This process MR. L. observed to be of greater specific gravity than the spherical or cystic portion, so that it always turned into the most depending position. He also remarked that it was projected or elongated from time to time, and again retracted, so as to be completely hid within the cystic portion, while this, in its turn, also assumed various changes of form, explicable only on the supposition of the whole constituting a living hydatid.

---

* *London Medical Gazette*, Vol. xii. page 110.—The case is illustrated by two wood-cuts.

" On the 3d current, when I had an opportunity of examining the case, I found the cornea slightly nebulous, the eye free from inflammation and pain, and the appearances and movements of the animal exactly such as described by **Mr. Logan**.

" When the patient kept her head at rest, as she sat before me, in a moderate light, the animal covered the two lower thirds of the pupil. Watching it carefully, its cystic portion was seen to become more or less spherical, and then to assume a flattened form, while its proboscis I saw at one moment thrust suddenly down to the bottom of the anterior chamber, and at the next drawn up so completely as scarcely to be visible. **Mr. Meikle** turned the child's head gently back, and instantly the hydatid revolved through the aqueous humour, so that the proboscis fell to the upper edge of the cornea, now become the more depending part. On the child again leaning forward, it settled like a little balloon in its former position, preventing the patient from seeing objects directly before her or below the level of the eye, but permitting the vision of such as were placed above.

" **Mr. Logan** has observed no increase of size in the animal while it was under his inspection. **Mr. Meikle** had watched it carefully for three weeks, without observing any other change than a slight increase in the opacity of the cystic portion. **Mr. L.** inclines to think that it is not likely to attain a larger size, and trusts that its natural period of existence coming to a close, will free the eye from the danger of disorganization."

My own experience does not enable me to add any information to that communicated by the authors to whom I have referred, and by others to whom I might also have referred, but it appears to me, that it is probable that some obstinate forms of ophthalmia, and particularly those cases of inflammation affecting the superficial textures of the eye, may be associated with the presence of entozoa, which, from their small size, the rareness with which they appear, and also the little suspicion we are apt to entertain of their presence, may be overlooked until serious injury is inflicted upon the organ of vision. I have several times removed small bodies resembling hydatids from beneath the conjunctiva (they have appeared to be developed in the subconjunctival cellular membrane), but as I have never been able to remove them in an entire state, I am not prepared to say, from an examination of their anatomical characters, that they were actually true hydatid formations.

# CHAPTER XIX.

## DISEASES OF THE SEMILUNAR MEMBRANE AND THE LACHRYMAL CARUNCLE.

### SECTION I.—INFLAMMATION OF THE SEMILUNAR MEMBRANE AND THE LACHRYMAL CARUNCLE.

The semilunar membrane and lachrymal caruncle may become inflamed, and such inflammation very commonly occurs either in consequence of local injury, or from some faulty position of the eye-lashes. A foreign body may have been propelled against, and have been imbedded in the lachrymal caruncle, and that will generally lead to inflammation, suppuration, and consequent atrophy of the caruncle, unless the foreign body be detected and removed.

This inflammation is characterized by a redness and swelling of the parts, by a certain degree of pain, by a stiffness and uneasiness in moving the lids, by a sensation as though sand or some foreign body were placed beneath them, by the free secretion of a puriform fluid towards the inner canthus, and by profuse lachrymation.

The disease may induce general ophthalmia, and it may also cause, or be accompanied by, tinea.*

---

* In stating that inflammation of the semilunar membrane and of the lachrymal caruncle may induce tinea, I should qualify the assertion by remarking that, when the tinea is so caused, it is generally limited to the nasal portion of the palpebral margins—it does not, or scarcely at all, affect that part of them situated towards the outer canthus—which are more or less red, the redness being very considerable immediately around, and near to, the caruncle, but becoming less distinct and severe as it recedes from it.

When the inflammation is very violent, the lachrymal caruncle in particular will be very much swollen, will, of course, prevent the closure of the lids, and, by consequence, will prevent the tears from passing into the puncta; and, very probably, the slight degree of inflammation and irritation which always exists around them when the lachrymal caruncle is inflamed, will, by diminishing the size of the orifice, and by causing them to become irritable in their action, assist in producing the epiphora. It is stated that inflammation of the caruncle may give rise to scirrhus of that part, but I have never noticed such an occurrence. I have known the lachrymal caruncle waste entirely away, and I have also known it remain permanently enlarged after inflammation, but I have never observed it to become affected with scirrhus, as a clear and direct consequence of the simple inflammation in question.

DR. MONTEATH states, that "he has seen inflammation of the lachrymal caruncle produced, in two instances, by a loose eye-lash, the root or thick end of which had fairly entered the upper punctum and canaliculus. Its other extremity consequently pointed downwards to the caruncula, which it constantly irritated."*

*Treatment.*—A few leeches to the inner canthus of the eye, will generally be necessary, and if the caruncle be much enlarged, it may be scarified, and the bleeding encouraged by frequent ablution with water, used as hot as can be conveniently borne. If the inflammation has been particularly severe, or if it has not been sufficiently influenced by treatment, it may have produced suppuration of the caruncle, and, as soon as that becomes evident, the suppurative process should be encouraged, the eye should be frequently fomented with warm or poppy water, and a bread poultice, enclosed in a fine linen bag, should be applied two or three times daily. As soon as the matter has sufficiently formed, it should be discharged, the warm applications continued as before, and the cure completed by the use of a little zinc lotion.

---

* See foot note to his translation of WELLER's *Manual*, Vol. i. p. 191.

CASE. — *Inflammation of the semilunar membrane and lachrymal caruncle producing permanent enlargement of the caruncle.*—A girl about twelve years old came to the infirmary with a very considerable enlargement of the semilunar membrane and lachrymal caruncle. The enlarged parts were very red, but scarcely at all painful. She could give no account of the cause and progress of the complaint, which was, however, soon removed by the application of leeches near the inner canthus, and by free and frequently repeated scarification. As this young person was recovering, her sister applied to me with a precisely similar condition of disease, which, it appeared, had existed for about a month; during which time she had been under the care of a cobbler of this town, who had put into her eye, every day, *a dark-coloured ointment*, with the assistance of a *knitting pin.* This case was also relieved by the plan of treatment which was so successfully employed for her sister. But although the inflammation was removed, the semilunar membrane and lachrymal caruncle remain in a state of enlargement.

## SECTION II.—CHRONIC ENLARGEMENT OF THE LACHRYMAL CARUNCLE.

The lachrymal caruncle sometimes enlarges in consequence of chronic inflammation, or from other causes, and when this takes place, the disease, this simple enlargement constitutes, is termed *encanthis*.*

Chronic enlargement of the lachrymal caruncle is not attended by any severe pain, and occasions no other defect than such as arises from preventing the closure of the lids, and the absorption of the tears by the lachrymal puncta; unless, indeed, it be very considerable in size, or unequal upon its surface, for then, in the former case, it may give rise to uneasiness by pressing upon the eye-ball, and, in the latter case, it may excite irritation by the friction of a rough irregular body upon the surface of the eye.

It is generally cured by the application of leeches near to the inner canthus, by repeated scarifications, and by the use of slightly stimulating or astringent applications, such as a solution of the nitrate of silver, of the sulphate of zinc, of copper, or of alum. But if it does not yield to these remedies, if it continues to increase, and if the inconveniences to which it gives rise are of a very annoying and troublesome character, it would be necessary to remove it by a surgical operation; and this is very easily accomplished. The tumour may be raised by means of a fine hook firmly fixed in its centre, and cautiously dissected from its connexions with a small scalpel;* taking care, at the same time, to avoid the lachrymal caniculi. It has been recommended to destroy it by means of the actual cautery, by caustic, by ligature, and so on; but excision, in the way now advised, seems to be the most prompt and the least painful and injurious method of removing it. **Pellier** says, that the removal of an encanthis by an able oculist, was followed by a dangerous hæmorrhage,† but, as **Mr. Guthrie** justly remarks, the hæmorrhage would probably not have been dangerous, if the operation had been performed by a surgeon of the present day. **Pellier** himself afterwards adds his testimony to the safety of the operation in the following words:—"J'ai souvent fait cette operation à des excroissances de cette nature, et jamais je n'ai èprouvé un pareil accident."

---

* The term encanthis has been applied to every variety of enlargement of the semilunar membrane and lachrymal caruncle ; [Wenzel, however, in his *Dictionnaire ophthalmologique*, defines encanthis to be nothing more than a " tumeur de la valvule semilunaire."] which was usually divided into two forms,—the simple, mild or innocent ; and the cancerous, fungoid, ulcerous, or malignant encanthis. Thus Banister (*A treatise*, &c. sec. viii. chap. iii.) states, that " of the encanthis there are two sorts : the one is most commonly tender, loose, without pain, red in colour, yielding easily to medicines. The other is malicious, hard, rugged, blewish, hauing pricking pain, not relenting by medicines, but is only curable by the hand of the chirurgian." " Encanthis (Heister. *Institutiones chirurgicæ*, p.2. sec. ii. cap. xlviii.) græce nominatur. Cujus bina fere genera sunt : namque mitior esse encanthis reputatur, quæ sine duritie atque doloribus est ; pertinacior autem atque maligna, quæ cum doloribus livet atque ad ipsum cancrum quodammodo spectat." Dionis also speaks of two forms of encanthis, he says, " il y en a deux especes, l'une indolente, rougeâtre, tendre et flasque, qui obéit facilement aux remèdes ordinaires ; et l'autre qui est douloureuse, plombée, maligne et rebelle aux remèdes, et qui ne se guerit que par l'operation." (Sixieme demonstration.)—" There are two species of encanthis : one of which is milder, and unaccompanied with pain or hardness ; and another, more obstinate and malignant, and which is attended with pain and lividness, and has in some sort a cancerous aspect."—Chandler. *A treatise on the diseases of the eye*, p. 109.

Sometimes the enlargement of the lachrymal caruncle is very considerable. **Scarpa** says, it is occasionally "as large as a hazle or chesnut."‡ **Benedict** has seen it increased "ad nucis avellanæ magnitudinem,"§ and **Purmannus** relates a case in which the diseased part "was as big as a man's double fist.‖

---

* If very small, it may be very safely and completely snipped away by means of the curved scissors.

† *Recueil d'observations sur les maladies de l'œil.* Part 2, obs. 118.

‡ *Practical observations on the principal diseases of the eyes.* Translated by Briggs, page 182.

§ *De morbis oculi humani inflammatoriis*, § 148. The same author speaks of a fungous and cancerous (not scirrhous) state of the lachrymal caruncle as a direct consequence of simple acute inflammation.

‖ *Chirurgia curiosa.* (London edition, 1706,) p. 59. The engraving with which this case is accompanied has an *appearance* of ludicrous exaggeration.

When the semilunar membrane is enlarged at the same time, and even in some other cases, a firm band of morbid structure runs for a short distance along the tarsal margin, and, of course, in all cases of this nature, it is desirable to remove such diseased prolongations at the time the other part of the disease is taken away, even though this proceeding necessarily involves the destruction of the lachrymal puncta. With a knowledge that the disease may so extend, it should never be suffered to acquire so great a size, if the subject of it will permit its extirpation at an earlier period of the affection.

CASE I.—" An Italian gentleman came to me who had a large excrescence in the great angle of his right eye. I passed a ligature upon the basis of it, and clipped it off close: then drying up the blood, I rubbed its remaining basis with the vitriol stone. The next morning I visited him, but saw nothing of the excrescence remaining, neither did it appear any more."*

CASE II.—" In *September* 1691, a Countryman came to me from *Weygelsdorff*, 48 Years of Age, who had such a *(Cancerous?) Tumour* in the innermost Corner of his Left *Eye*, of two Years Continuance. He suffered much, and had tried many Chirurgeons and Physicians to no purpose, for it still grew worse and worse; when he came to me, it was as big as a Man's double Fist, and yet neither the *Eye* (save only that it was covered with it) nor the *Nose* had suffered any thing considerable. After the Patient had been prepared by DR. REGIUS, I made a restriction as deep and high as I could, upon which it presently appeared something *flaccid*, and I could every day tie a *Ligature* deeper about it, which I repeated six times; the flesh still growing more foul and stinking; on the ninth day I cut it off without bleeding, or any other troublesome accident. To what remained behind and at the bottom of the *Ulcer*, I applied an *Actual Cautery*, with which I thrice gently burned it. The patient in eight weeks time was perfectly cured, and lives in health at this present time." *

---

* WISEMAN'S *Surgery*, page 328.

## SECTION III.—FUNGOUS ENLARGEMENT OF THE LACHRYMAL CARUNCLE.

I have seen the lachrymal caruncle enlarged, and at the same time uneven upon its surface, so as to resemble a small raspberry. Its structure has been remarkably loose, its colour florid, and its size much increased; and I have termed this condition of things, the fungous enlargement of the lachrymal caruncle. This is the *encanthis fungosa* of authors, and requires for its complete cure, in many instances, a surgical operation; but I do not know that there is anything of a malignant nature belonging to it. I cannot recommend the application of caustics or stimulants, or indeed any very irritating substances, with a view of destroying it, for the use of such applications is sometimes succeeded by very bad consequences. It would be far better to remove it at once by a surgical operation, and, at the same time, take away any portion of the semilunar membrane which may happen to be similarly diseased.

## SECTION IV.—SCIRRHOUS ENLARGEMENT AND CANCEROUS ULCERATION OF THE LACHRYMAL CARUNCLE.

The lachrymal caruncle is sometimes the seat of scirrhus, and it begins in the following manner:—at first, the part is slightly enlarged and rather painful, the pain having the lancinating character of scirrhus in other situations, the eye waters, and is, what is usually phrased, weak. The caruncle itself is only a little increased in size, it is of a dark-red colour, and is often unequal or granular upon its surface, and the inequality is widely different from that of the preceding variety—the granules are small, compact and firm, not large, loose and spongy. The peculiar character of the pain is very remarkable, but the epiphora to which it gives rise is a symptom common to all the forms of enlargement of the caruncle. As the disease advances, it becomes rather paler over certain parts of its surface, varicose vessels ramify upon it, or in its neighbourhood, the pain is much more intense, and it may even ulcerate, the ulceration when it takes place, possessing all the characters of true carcinoma. The semilunar membrane, and even the conjunctiva and eye-lid, may become implicated in the diseased process, if it be allowed to remain after its malignant nature has become quite evident. It is said that the disease in question is not genuine scirrhus, that it has not the anatomical characters of ordinary scirrhus, and that it never arises except as the result of local injury, or in consequence of the injudicious use of stimulating and irritating substances to the eye or to the caruncle, as remedies for its inflammation, but I do not believe that either of these statements are correct. I have removed one scirrhus caruncle, and one only, and although it did not possess the characters of scirrhus in a remarkably well-developed form, yet its structure was firm, was interspersed with white lines, and resembled scirrhus more than any other morbid structure with which I am familiar.*

---

* PURMANNUS. *Chirurgia curiosa.* (London edition,) p. 59.

---

* The anatomical qualities of the lachrymal caruncle would certainly not leads us, *a priori*, to suppose that it would claim an invariable exemption from scirrhus, for, in respect to the firmness and many other qualities of its texture, it pretty closely resembles various parts which are obnoxious to scirrhus, in other situations, such, for instance, as the pyloric orifice of the stomach, the mouth and neck of the uterus, &c.

In the event of ulceration occurring, various changes may take place in surrounding parts, and they will chiefly depend on the extent of the disease. It may lay open the lachrymal passages, or destroy, more or less extensively, the eye-lids, or the conjunctiva, and, what is a source of great annoyance, the eye is rendered irritable by the lodgment of the discharge from the carcinomatous ulcer, upon its surface, and the parts immediately beneath the lower eye-lid are inflamed and excoriated by its passage upon them.

*Treatment.*—The palliative part of the treatment would consist in the diligent use of poppy, and various other warm narcotic applications, and in the administration of opium in pretty large quantity. The parts should be kept clean, and some writers recommend that leeches should be occasionally applied to the inner canthus. The propriety of applying leeches will be determined by the stage of the disease; if it has not proceeded to ulceration, leeches may be useful; but, if otherwise, I do not see in what way they can render the slightest service, unless indeed, there be a good deal of surrounding inflammation. The important part of the treatment consists in the extirpation of the diseased part, for, in no form of encanthis, is this more necessary, and that too at an early period of its existence; and the only direction I am anxious to give, in respect to operation, is, that the part should be completely removed—much more *carefully* and *thoroughly* removed, than where it is simply enlarged, independently of the existence of this disease. In doing so I am aware that we necessarily occasion one evil, and increase the hazard of producing another, but we must incur the disadvantages connected with the absence of the lachrymal caruncle, and also the hazard of penetrating the lachrymal channels (which may be done in the attempts to remove the disease completely) rather than, by endeavouring to avoid them, incur any risk of leaving the slightest portion of the disease behind. After the operation the parts may be freely bathed with warm water, and, in the course of the after treatment, we should carefully abstain from the use of all irritating and stimulating applications, and we need not be anxious about the healing of the sore, but leave that to time and nature, only assisting with the mildest remedies, or the most soothing applications.

We have not often an opportunity of seeing a scirrhous affection of the lachrymal caruncle in England, but, I should imagine, from the mode in which SCARPA and other foreign writers speak of it, and the minute and circumstantial manner in which they describe the various forms of malignant encanthis, that it was a disease of frequent occurrence in some countries. When I mention that MR. LAWRENCE says he has never seen an enlarged caruncle which required excision or any other surgical process, and that he is quite unacquainted, from personal observation, with the malignant encanthis, it will be imagined that the disease we are considering is not of very frequent occurrence;* but, it does sometimes occur, as the experience of many of the ancient, and the testimony of some modern writers on diseases of the eye, attest.†

---

* "I have never known the encanthis assume the malignant character ascribed to it by some authors." TRAVERS. *A synopsis, &c.* page 103.—"I have never known the lachrymal caruncle assume a scirrhous or cancerous character." GUTHRIE. *Lectures on the operative surgery of the eye*, page 128.—Scirrhous enlargement of the lachrymal caruncle is neither represented by WARDROP, nor described by DEMOURS.

† For instance, EDMONSTON (*A treatise on the varieties and consequences of ophthalmia, &c.* p. 167,) BENEDICT (*De morbis oculi humani inflammatoriis*, § 150,) WELLER, (*A manual, &c.* p. 194,) and MACKENZIE (*A practical treatise, &c.* p. 205.)

### SECTION V.—ATROPHY OF THE LACHRYMAL CARUNCLE.

In old persons the lachrymal caruncle will sometimes become very small, so as to be almost entirely wanting. After an attack of inflammation, atrophy of the lachrymal caruncle will sometimes take place; and the same occurrence has, under my own observation, succeeded the infliction of local injury, which, however, has not produced any severe degree of inflammation. Atrophy of the lachrymal caruncle, like hypertrophy of that part, always produces a certain degree of epiphora. Sometimes one or two strong and curved hairs grow from the lachrymal caruncle which excite a good deal of irritation unless they are frequently removed.

I have never observed that the lachrymal caruncle has been absent from birth, whilst the other parts of the eyeball have been properly developed; in fact, this part does not appear to be so subject to congenital defects—to vices of development—as many of the other textures of the eye and its appendages.

# CHAPTER XX.

## DISEASES OF THE MUSCLES OF THE EYE-BALL.

### SECTION I.—PALSY OF THE MUSCLES OF THE EYE-BALL.

By the term palsy, or paralysis of the muscles of the eye-ball, I particularly refer to an affection of the third pair of nerves, whereby the muscles it supplies are deprived of their power of action; however, as I have formerly mentioned, the muscles of the eye become paralysed, at least the eye becomes fixed in its socket, after the division of the fifth pair of nerves, or, to use the language of MAGENDIE, "the eye-ball resembles an artificial eye, placed behind the eye-lids, deprived of all motion." In the latter case, however, (after the section of the fifth pair of nerves) the eye-ball is immoveably fixed in its socket—there is not the slightest degree of mobility remaining—and the cornea is directed immediately forwards; but, when the disease depends on an affection of the third pair, the eye-ball is rolled outwards, and, of course, the cornea is turned in a similar direction, and, under particular circumstances, a certain degree of mobility remains. Now, in order to form a correct idea of the full effect of that condition of the third pair of nerves upon the muscles of the eye-ball which has been termed paralysis, we must not forget the number of muscles it supplies wholly or in part;—it proceeds to, or by anastamotic communications furnishes the nervous supply of, the rectus superior, rectus inferior, rectus internus, the obliquus inferior, and, lastly, the levator palpebræ, so that, presuming that morbid condition of the third pair of nerves to exist, which produces paralysis of the muscles it supplies, and, to exist alone, we readily perceive what effect will necessarily occur, *first*, as regards the muscles of the eye-ball; *secondly*, as respects the direction of the cornea, and, *thirdly*, as relates to the state of the upper eye-lid.

*Symptoms.*—The eye-ball will be nearly immoveable, the cornea will be turned outwards, and the upper lid will droop more or less completely. If the patient be directed to look as much outwards as possible, the action of the external rectus will be sufficiently evident, and there will be a slight rolling motion of the eye-ball, probably from the combined action of the rectus externus and the superior oblique muscles, but if he be asked to look directly downwards, or upwards, or inwards, no motion of the globe will be perceived—in short, he cannot direct the eye in any of these directions. But it may happen that, in the course of the affection, the cornea may recede from the temple, and be ultimately directed as in a natural state of the organ when looking straight forwards, but, in such case, the eye-ball is still motionless, for the original disease remains, and the cause of this apparently favourable change depends on the additional effect produced by disease of the fourth and of the sixth pair of nerves, or upon that of the fifth. Nothing is more reasonably to be apprehended, than that the disease which interrupted the functions of the third pair of nerves, may eventually affect also those of the neighbouring cerebral nerves; and I may remark, that according to the nature and the extent of the disease which interferes with the functions of the third pair of nerves, will be the degree of immobility of the eye-ball; for, if the antagonizing muscles (the rectus externus and the obliquus superior) retain a part of their vigour, the eyeball will rather sustain a quivering and shaking motion, than be altogether deprived of its mobility. Combined with these effects upon the eye, there may be various symptoms of disease of the brain, and such complication of disease is always to be apprehended. The sight sometimes remains, but is more commonly destroyed, it is almost always present in degree at the commencement of the disease, but, in its progress, is frequently destroyed; however, that will depend on the implication of the second or the fifth pair of nerves, or, on the occurrence of disease in the brain, or, lastly, on the extension of that malady which originally evinced its existence by destroying the energy of the third pair of nerves.

*Causes.*—The causes of this affection are usually such as occasion pressure upon the third pair of nerves at some part of their course, such as a tumour of the brain, or, in the neighbourhood of the third pair of nerves at some part of its course, or at its origin. It may also arise from irritation of the brain, or from various structural changes in the nerve itself. We should be induced to suspect that the disease arose either from some structural change in the nerve, a tumour of the brain, or some chronic disorganization of that part, when it occurred very slowly and gradually; but when the malady became suddenly developed, we should be led to suspect the effusion of serum, or the extravasation of blood, in, or near to, that part of the brain whence this nerve arises or along which it passes in its progress to the orbit.

*Treatment.*—In almost every instance there is little chance of affording much benefit, and the case is rendered absolutely hopeless when an affection of the fourth, fifth, and sixth pairs of nerves supervenes upon that of the third. Before commencing the treatment, of course it is quite necessary to detect, as far as possible, the cause upon which the disease depends. If we have reason to believe that it is owing to the development of some tumour or deposition in the structure of the nerve, occasioned by inflammation, bleeding and mercury would be proper, if without inflammation, we might use iodine or mercury, with some prospect of advantage; but if the mischief appeared to arise from organic changes in the brain, I scarcely know what to recommend in particular; for the treatment of the paralytic affection of the muscles of the eye-ball would then resolve itself into the management of the morbid affection of the brain. If it arise from the sudden effusion of serum or blood, the cause of such effusion must be sought for, and the treatment must be modified accordingly. Nearly all the recoveries I have witnessed where the paralytic affection of the muscles of the globe was complete, have occurred where such paralytic affection depended on this latter cause, the recovery being as slow and gradual, as the occurrence of the disease was sudden and speedy; the duration of the disease, when so arising, may, of course, be abridged by the employment of suitable remedies, so as to quicken the absorbent process, the speed of which may be modified by an infinite variety of circumstances connected with the constitutional condition of the patient, as well as by the nature of the treatment employed. If the disease be stationary, if there be no manifest symptoms of disease of the brain, or of the extension of disease to the neighbouring cerebral nerves, if no inflammatory symptoms be present, and, in short, if the case be one of simple paralysis of the muscles of the globe from an affection of the third pair of nerves, unattended by inflammatory symptoms, it may be desirable to try the effect of counter-irritation, by making a small issue or seton in the temple, by the application of blisters just over the eye-brow, or by the use of the tartarized antimony ointment. Electricity may also be employed in the usual manner; and, having so employed it with due perseverance ineffectually, we may then try the effect of strychnia, sprinkled upon the raw surface produced by a blister applied immediately above the eye-brow, with the precautions and according to the directions mentioned at page 282 of the present volume.

Any cause acting locally upon the sixth or abducent oculo-muscular nerve, so as to compress it, disease of its texture, such as atrophy, ramollissement, &c., may so impair its function, that the parts it wholly or chiefly supplies may become paralysed; and this will be rendered evident by a slight drooping of the upper lid, and by an inability to direct the eye outwards (temporally.) It is manifest that various causes, in addition to those which operate locally upon the nerve itself, may destroy its function, and that it is not often that we can clearly satisfy ourselves with respect to the precise character of the cause of the malady (for almost every morbid affection of the cavity of the orbit, and of the orbital adipose and cellular membrane may be ranked among its causes) and even in those cases in which we are able to accomplish all this, we are still, in the great majority of instances, wholly unprepared to communicate relief, much less to effect a cure.

## SECTION II.—STRABISMUS.

A person is said to be the subject of strabismus, if, in the ordinary state of the eye when engaged in inspecting objects situated immediately before it, one or both corneæ are involuntarily directed more outwards or inwards than they ought to be. I say, one or both corneæ, because it may happen that the strabismus may only affect one eye, and, in such case, on inspecting any object situated immediately in front of the eye, the cornea of the sound organ may be directed forwards, but that of the diseased eye will be directed either inwards or outwards. It will be observed that an individual who has strabismus of one eye only, cannot direct both eyes towards the same object at the same time—one of them will always be turned away from it. The cornea is more generally directed inwards than outwards (that is the more common defect, but the reverse of this may take place, and the cornea may be directed towards the nose) but if one eye be closed, the opposite organ will acquire its proper central situation; and this is an important fact to bear in mind, in conducting the treatment of strabismus arising under particular circumstances. Vision is more or less defective, and if the disease affects both eyes, the patient is generally near-sighted, and sees more or less confusedly; if the disease exist only in one eye, the sight of the squinting eye is generally weak and defective. Double vision is a frequent attendant on strabismus in consequence of a want of correspondence in the movements of the eye, whereby that part of the retina upon which luminous impressions fall, is not similar in situation, does not, in short, perfectly correspond in each organ, and to this source of double vision may be added the difference in the visual power of the two organs, which, as I before stated, so generally exists.

When the cornea is directed inwards (nasally) the disease is termed *strabismus convergens*, and, on the contrary, when it is directed outwards (temporally) it is called *strabismus divergens*.

I shall proceed to point out many of those causes of, or circumstances connected with, strabismus, which, as far as we are at present aware, constitute its more ordinary causes.

1.—In early life, children are sometimes placed very injudiciously in their cradle, or they are, perhaps, very generally carried in one and the same position, so that the light gains more frequent and complete access to one organ than to the other, in consequence of which, that eye which is most familiarized with the influence of the luminous rays, is more readily stimulated by them, and the other is rendered, in a corresponding degree, the more insensible to them. Again, sometimes the infant's cap is ornamented with a long and party-coloured border, so that it readily attracts the child's attention, and he is continually turning the eyes towards it, as he lies in the cradle. In the same way a small spot, nævus, or tumour upon the nose, may produce squinting by disposing the child to look at it very intently, and he is inclined to make great and repeated efforts to turn the eyes towards the object of attention, because it is not distinctly seen, so that the eyes being thus accustomed to assume a particular direction, acquire, not only a habit of so looking, but their muscles absolutely become changed in their relative power, and the disease becomes either inveterate, or confirmed. Of these two causes of infantile strabismus, the former will cause *strabismus divergens*, and the latter *strabismus convergens*.

2.—The eyes sometimes possess—naturally possess—different degrees of strength, the retina of one being much less sensible to light than its fellow, and in such cases the weak organ will generally squint. The sound eye, being engaged in the attentive inspection of objects, will be properly directed, and a due impress will be made upon it, but the weak eye will roll about in its socket, without any object making a sufficient impression upon its retina to fix its functional attention, and will eventually acquire a direction different from that of the strong one, the motions of which it will not follow.

3.—The muscles will sometimes vary in their power. I remember a case where a child had divergent strabismus of the right eye, and being anxious to notice if any cause for it could be detected after the child's death, I gained permission to examine the eyes, and, certainly, the external rectus of the eye affected with strabismus, was much larger than it ought to have been—much larger relatively to the size of the other muscles of the same eye, and, comparatively, with those of the opposite organ. Other circumstances may induce a disproportion in the form and power of the muscles of the eye-ball, and will lead to the establishment of a variety and extent of strabismus, corresponding to such changes.

4.—Opacity of the cornea, partial opacity of the lens or its capsule, alteration in the situation of the pupil, will each of them produce strabismus, in a manner which I need not stop to explain fully, but, I may mention, that if the pupil be drawn permanently towards the temporal side of the eye, or if extensive and dense opacity exist at the inner part of the cornea, strabismus divergens will be likely to be produced; and the contrary will take place when the cornea is very opaque towards its outer part, or when the pupil is drawn towards, or is situated at, the inner margin of the cornea. A small opacity in the centre of the cornea, or central opacity of the lens, or of its capsule, may induce strabismus by causing a difference in the visual power of the two organs.

5.—Strabismus may be induced by various forms of injury suddenly inflicted upon the eye, and MR. MACKENZIE has mentioned a case in which squinting was caused by squirting the juice of fresh orange peel against the surface of the eye, which, at the same time, produced considerable smarting.

6.—Squinting is oftentimes one of the symptoms of amaurosis, of disease of various parts of the nervous apparatus of the eye, of disorder or disease of the brain, and of the alimentary canal, (and particularly when such disorder is occasioned by the presence of worms,) of teething, &c. Various morbid states of the third pair of nerves are succeeded by divergent strabismus, and, on the contrary, convergent strabismus is very generally associated with diseased conditions of the sixth pair.

7.—Imitation is certainly a cause of strabismus; parents will often tell their medical attendant that their child did not squint, when he left home for school, but, on his return, the strabismus was complete; and the child will probably mention that many of his school-fellows also squinted, because they were frequently mocking or imitating each other. No cause of strabismus is more satisfactorily made out than this.

8.—Sometimes one of the eyes happens to be inflamed in early life, and it is carefully bound up, until its visual powers become impaired from prolonged repose from its natural actions and the long absence of its natural stimulus; such an eye will be liable to be affected with strabismus, unless, which is very improbable, its retina should again recover its sensibility. In other instances both eyes will be carefully protected from the light for a similar reason; they may, perhaps, be slightly inflamed, and the surgeon may tell the parents of the child to protect them from the influence of bright light, and they will bind them up, as they conceive, very carefully, in order to fulfil, what they presume to be, the Doctor's wish the better, and in this way the patient will be totally deprived of his sight during the continuance of the ophthalmia, at least, according to the parent's intention; but children do not like this deprivation, and therefore so change the situation of the bandage, as to see either upwards or downwards, and, in this way, acquire a habit of squinting. Many of the worst cases of strabismus of both eyes, which it has fallen to my lot to notice, have been so caused.

9.—A temporary strabismus is sometimes induced by violent passions or emotions of the mind; such cases depend, of course, on an affection of the brain, (probably irregular and partial, not general, congestion of blood) occasioned by this mental disquietude or agitation.*

*Treatment.*—If strabismus depend on dentition, or on the presence of worms, or on disorder of the alimentary canal arising from any other cause, the nature of the plan of treatment it would be necessary to employ for its removal, is sufficiently obvious. But, presuming that it arises from disease of the brain, or from some disorganizing change in that part, the treatment of the strabismus will, of course, be merged into the management of the more important malady. If there is reason to believe that it arises in one eye, from a diminution in the power of the retina, from a part of those causes previously mentioned, or as the effect of some early habit, whereby the cornea of the eye has been more accustomed to assume an external or an internal direction than it ought to have been, it would be correct practice to tie up the sound eye for several hours daily and make the child exert the weak one in following his amusements, and in the inspection of proximate, and especially remote objects: and in this way, by due perseverance, we may, perhaps, by giving that tone to the muscles of the eye-ball, and to the retina, which bringing them into action is so well calculated to communicate, frequently cure very bad cases of strabismus.

---

* I have noticed it on several occasions after the application of a blister behind the ear, but it has never lasted long—it has not, in a single instance, been permanent when so produced.

On the same principle, many mechanical contrivances have been employed, so as to bring the muscles of the weak eye into active and fit exercise, as well as to increase the sensibility of the retina by engaging it in the objects of vision; all of them having for their object the direction of the cornea forwards, so as to occupy that central situation, and to obtain that direction which the cornea of the healthy eye possesses when engaged in the inspection of objects placed immediately before the eye. An ingenious method was proposed by DR. JURIN, for the purpose of effecting these objects:—that learned individual states, that where the strabismus existed only in one eye, he directed that the healthy organ should be closed, when the cornea of the diseased eye immediately assumed its central position, he then requested the patient to fix his attention upon some person, who stood immediately before him at a convenient distance; and, after the eye had been sufficiently fixed in this position, he recommended that the previously closed organ should be very gradually opened. The cornea of the weak eye soon turns aside when this experiment is first tried, but by judicious repetition and due perseverance, it is sometimes enabled to maintain its proper position for several minutes, and the defect is eventually removed. I am satisfied that many very obstinate cases of strabismus of one eye, arising from a want of a regular and due exercise on the part of the muscular apparatus of the eye-ball, may be cured by carefully carrying into effect this simple method of management. Under my own observation, very great benefit has been obtained in many examples where a complete and absolutely perfect cure has not been accomplished—that is to say, the strabismus has recurred now and then, but in a much less decided manner than formerly.

I need not point out the vast variety of contrivances which have been advised by various scientific individuals, for the removal of strabismus, for they are nearly all based on the same principles, their object being to bring into exercise those muscles which have been allowed to remain passive, or to become very inactive, and to re-excite, in a full and ample manner, the sensibility of the retina which has been allowed to become impaired.

When strabismus depends on dense opacity of the cornea, partial opacity of the lens, or its capsule, change in the situation or figure of the pupil, it either cannot be removed, or it would not be adviseable to practice those measures for its removal it might be necessary to adopt in order to accomplish this object.

I deem it to be of the first importance in the treatment of squinting, whether affecting one or both eyes, that its causes should be accurately made out, and if it does appear to arise from dentition, from the presence of worms, from disorder of the alimentary canal, and various other circumstances of that nature, its cure is almost certain; and again, when it arises from any defect in the muscles of the eye-ball, or any impaired sensibility of the retina, such impaired sensibility not being congenital nor dependent on any opacity of those textures which are naturally transparent, its cure will, very probably, be accomplished; and, in reference to this latter class of causes, I shall conclude my remarks by observing, that in accordance with the particular variety of the defect (I am referring to the latter class of the causes of strabismus which have been just mentioned), whether it exist in one or both organs, whether it be its convergent or its divergent form, I shall beg to call especial attention to the principles upon which the surgeon should act, and the objects he should keep in view, in his efforts to accomplish a cure:—bring into action those muscles which have been allowed to remain in a state of comparative inactivity, by the agency of that contrivance which may be judged best adapted to the particular case; and by bringing those muscles into action —by urging the cornea into its natural and central situation—the retina is exposed to the full, free, and complete stimulus of light, and we thus re-establish, if that be practicable, its natural, its healthy, and its original degree of sensibility.

### SECTION III.—WANT OF CORRESPONDENCE IN THE ACTION OF THE MUSCLES OF THE EYE-BALL, PRODUCING DOUBLE VISION.

A want of correspondence in the action of the muscles of the globe may occur, the effect of which will be to cause double vision. This want of correspondence, although sufficient to lead to this perplexing defect, may be so trifling in degree, as scarcely to be rendered evident to our observation by any distortion of the eyes—their direction will be pretty nearly such as it ought to be; but, on a very close and attentive examination, it will be found that a slight difference exists, that, in short, the cornea of one eye is less centrally situated than that of its fellow if the patient be looking at an object placed directly before him. I do not know that I should have mentioned this circumstance, for really it is nothing more than a slight degree and an incipient form of strabismus, but, the double vision to which it gives rise may be referred to an affection of the brain, unless the surgeon is fully aware of the fact, and of the nature of the malady to which I am now directing attention, and the patient may, consequently, be needlessly subjected to a severe course of treatment. It will be remembered that there is sometimes a want of correspondence in the action of the muscles of the globe, produced by various causes, which may give rise to double vision, but which may be scarcely evinced by any perceptible distortion of the eye or eyes, and that it is essentially a muscular defect. It arises generally from slight disorder of the health, is frequently temporary in its duration, and is cured by quietude, by attention to the state of the stomach and bowels, and by the application of blisters, or the adoption of some form of counter-irritation, either to the nape of the neck, the temples, or the vertex.

### SECTION IV.—OSCILLATION OF THE EYE-BALL.*

I have before mentioned that the eye-ball sometimes acquires a semirotatory, or an oscillatory motion; that this motion is effected quite independently of the will; that patients are generally unconscious of it; and that it may exist either to a very trivial, or a very great extent; so that it may be scarcely observable, or, otherwise the eye-ball may, pretty rapidly, roll to and fro for a fourth of its circumference, that is, nearly half way from the attachment of the external to that of the internal rectus muscle. The state of vision is always more or less confused, and, what is very remarkable, persons so affected, do not, invariably, say that objects appear to be in motion; although the eye itself is evidently in constant motion; on the contrary, they represent them, in the general, as being just as steady, fixed, and stationary, as they were prior to the accesion of the disease. Some persons can suspend this rolling action of the eye-ball for a short time, although, when no effort is made to do so, it is in constant motion, but they cannot prevent it for any considerable period. I presume it depends on some undue action of the oblique muscles, an action which may be termed also antagonizing, because it is quite evident that, in many of these cases, the power of moving the eye upwards and downwards, or to either side, remains, and is just as perfectly performed as ever. The eye-ball is not necessarily diseased, but it may be so, and, in such cases, it would be an error always to associate, as cause and effect, the diseased state of the globe or of any of its individual textures, with the oscillatory motion it performs. The diseases of the eye with which it has been *most frequently* associated, as far as my observation has enabled me to determine, are synchisis oculi—softening with atrophy of the eye-ball—amaurosis—and congenital cataract.

---

* This disease has been known from a very early period; it was considered by GALEN to consist of a defect in the muscles of the globe, and BANISTER, in his work, published in 1622, has devoted an entire chapter to the consideration of " the shaking eye, or horse eye."

*Causes.*—I do not think we can fairly attribute this disease to any affection of the third or fourth pair of nerves, for, in either case, we cannot readily imagine how the rotatory motion could be produced; for instance, what affection of the third pair, adequate to produce any material effect upon the inferior oblique, would not also produce an equal, or, at least, a similar effect upon the other muscles it supplies? and again, with regard to the fourth pair, how could any morbid affection of it enable the superior oblique to move the eye-ball to and fro, to the extent we sometimes witness in oscillation of the globe? Any thing which impairs the sensibility of the retina, or which permanently impedes the access of light to that part, may occasion this semirotatory movement of the eye-ball, such, for instance, as nebula of the cornea, diminished transparency of the capsule, or, of the lens, imperfect amaurosis, and so on. On this account, the disease is occasionally witnessed after strumous ophthalmia; as an early symptom of amaurosis; and, in that condition of the retina which sometimes remains after the absorption of congenital cataract at an unusually late period of life. It would appear that, in all these instances, the eye does not gain a sufficiently distinct perception of objects to become fixed upon any one, or any set of them, but wanders indifferently towards every object which is presented to its notice in a sufficiently decided form to produce a *certain*, but not a *strong* degree of impress upon the retina.

*Treatment.*—Where the oscillation of the eye-ball appears to depend on that state of impaired sensibility of the retina which is apt to occur when congenital cataract has been allowed to remain for too long a period before an operation has been undertaken for its cure, the use of the following contrivance may be advantageously had recourse to:—procure an ordinary spectacle frame, and place a piece of dark coloured wood in those apertures which usually contain a glass, and, in the centre of this piece of wood, let a small circular opening be made, not larger than two lines in diameter, and let the patient wear this apparatus for some time, during a considerable part of the day. In this way the pupil is directed towards the light, and the eye-ball is rendered much more steady than it otherwise would be, or, at all events, its oscillatory movements are much controlled. The contrivance to which I have just referred has been long employed for the purpose of quieting the irregular movements of the muscles of the globe, and it is particularly recommended by BANISTER. With the use of the foregoing contrivance may be combined blisters to the forehead, or a seton in the temples; and the use of those means which are calculated to improve the state of the general health, if that appear to be disturbed, or, if amaurotic symptoms are combined, then, of course, medical attendant. On examining the eyes every thing appeared to be quite perfect—there was not the slightest appearance of increased vascularity either about the eyes or the lids. When the paroxysms recurred, it was represented as producing a sensation as though the eye was forcibly compressed, and the pain was excessively violent; the eye was sometimes darted rapidly about in its socket but it was generally forcibly fixed and slightly retracted. Conceiving that there was present a neuralgic affection of the eye-ball, with a spasmodic condition of its muscles, I directed the carbonate of iron to be taken three times a day, and the eyes to be freely and frequently fomented with a strong decoction of poppies, or an aqueous solution of opium, and, if the pain recurred with great severity, I also recommended that a small quantity of mercurial ointment mixed with a grain and a half of opium, should be rubbed upon the forehead, just above the eye-brow. Such were the chief measures I proposed for the relief of this tormenting and most distressing affection, and, by duly persevering in their use, and combining with them various other directions for the improvement of the general health, I have had the satisfaction of preventing any really severe paroxysm of pain from the time at which my attendance was requested to the present period.

## SECTION VII.—ATROPHY AND HYPERTROPHY OF THE MUSCLES OF THE EYE-BALL.

ATROPHY OF THE MUSCLES OF THE EYE-BALL.—One or more of the muscles of the eye-ball may become atrophic: the former generally from an undue strength or action of its antagonizing muscle, and the latter from very many causes. When a muscle becomes completely atrophic, its volume is reduced, it becomes paler than when in its healthy state; its fibrous structure is less distinctly developed, it is softened, and rendered less compact, and, of course, its strength of action is proportionately reduced. It is right, however, to bear in mind the distinction between natural and morbid atrophy—certain parts become atrophic as soon as extra-uterine life begins, because they are no longer required, and others again, waste entirely, or almost entirely away in advanced life, from a want of that vital energy which is necessary to the due performance of their functions, such, for instance, as the ovaries, &c.

I shall now proceed to point out many of the circumstances connected with atrophy of the muscles of the eye-ball.

1.—One of the muscles of the eye-ball may become atrophic from an undue strength or action of its antagonizing muscle, which, by controlling its power, limits its sphere of action and induces wasting of its volume.

2.—The muscles of the globe generally become atrophic after collapse of the eye-ball, just as similar parts in other situations become atrophic, when the necessity for their action either ceases altogether, or becomes materially diminished, and this is the more likely to happen when both eye-balls are collapsed.*

3.—It may also take place from any other disease which interferes with the freedom of their action, or which prevents that action entirely.

4.—An undue deposition of fat within the orbit, and particularly when deposited immediately around the muscles of the eye, will be likely to produce atrophy, which, according to the situation and amount of such deposition, will be likely to occasion either partial or general atrophy.*

---

* When one eye only is in a state of partial collapse, and an artificial eye is worn, atrophy of the muscles will not, however, take place, because they are still engaged in executing their ordinary functions, which is widely different from, what might almost be termed, *the attempt at action* which occurs when the eye-ball is much collapsed—for it is then only *slightly moved*, and not *actively rotated* to and fro as is its fellow.

5.—The muscles of the eye-ball become atrophic from various causes which diminish their vascular supply, or impair their nervous energy, whether such diminution of vascular supply, or impairment of nervous energy, be of a local or general character, whether it affect the eye-ball merely, or the system generally.

*Treatment.*—Partial atrophy of the eye-ball, affecting particularly only one muscle, such as exists in many cases of strabismus, is best cured by that amount of exercise which shall restore it to its proper sphere of action; to acquire its former and its proper degree of strength and magnitude, it must be frequently called into action, and I have already explained how this object is to be attained. The other forms of atrophy rarely admit of relief, but it is not the less necessary to be acquainted with the facts, that not only does atrophy of the muscles of the eye-ball occur, but that such atrophy may be either partial or general, and may arise from various causes, some of which are remediable, but the majority of which do not even admit of the slightest relief. When the disease is irremediable, it is often associated with some more important malady, and I may remark, that it is very rarely an idiopathic and uncombined affection.

HYPERTROPHY OF THE MUSCLES OF THE EYE-BALL.—The opposite defect to that I have just been considering may exist—the muscles of the eye-ball may become hyper-

---

[*] When parts of the body waste, there is a disposition in the animal economy to supply their place by the secretion of fat. I believe, however, this rule does not obtain in the instance of collapse of the eye-ball—the orbital adipose membrane is not increased when a diminution in the volume of the other parts of the contents of the orbit takes place.

trophied, and this state of hypertrophy may be either partial or general, just as in the former case. I have discovered the existence of hypertrophy of the muscles of the eye-ball in one case of *neuralgia bulbi*, in which the globe was continually darted from side to side, and in various directions, under the influence of the severe suffering the disease occasioned, and these violent and sudden movements were most frequent when the neuralgic paroxysms were most intense. I have also inferred its existence in many other cases, where similarly sudden and violent motions of the eye-ball existed, and, in one case, were formerly a band of firm cellular membrane existed at the outer canthus of the eye (in consequence of a burn of the conjunctiva)—which, at first, materially interfered with the movements of the eye-ball inwards, but which, by the frequent and powerful action of the rectus internus, was eventually elongated so as scarcely at all to interfere with the motions of the globe—I ascertained the fact by post-mortem examination. This patient died suddenly, and I had an opportunity of examining the eye and the state of its muscles, to which my attention had been particularly directed, in consequence of having attended him at the time he met with the accident to his eye.

When I had written these remarks upon hypertrophy of the muscles of the eye-ball, I carefully examined many works before I could find any account of a similar affection, but Mr. Guthrie has, I perceive, noticed the same fact. He says, in allusion to a case of aneurism of the ophthalmic artery, " on the death of the patient, an aneurism of the ophthalmic artery was discovered on each side, of about the size of a large nut; the vena ophthalmica cerebralis was greatly enlarged, and obstructed near where it passes through the foramen lacerum orbitale superius, in consequence of a great increase of size the four recti muscles had attained, accompanied by an almost cartilaginous hardness, which had been as much concerned in the protrusion of the eye as the enlargement of the vessels.."*

The symptoms of hypertrophy of the muscles of the eye-ball would be the usual indications of the increased power of any set of muscles, as respects the movements of the part to which they belong, with the symptoms of pressure of the globe, such as is produced by a tetanic or spasmodic action of the musculi bulbi, and also a protruded or prominent state of the eye-ball, whenever they become so much enlarged as to occupy any very considerably increased space in the orbit without a corresponding absorption of its adipose substance.

## SECTION VIII.—CHANGES WHICH OCCUR IN THE MUSCLES OF THE EYE-BALL IN THE PROGRESS OF VARIOUS MALIGNANT DISEASES.

The muscles of the eye-ball become changed in scirrhus of that organ (and particularly when it affects the orbital cellular membrane) into a pale, and a somewhat indurated mass, their bright red and fibrous character being in a great measure lost, and their volume much reduced. When fungus hæmatodes attacks the eye-ball, they are more or less extensively involved in the diseased alterations; but I have previously stated that muscular fibre is not very obnoxious to this medullary change. I cannot call to mind any author who has very accurately described the changes which the muscles of the eye-ball undergo, when the globe is the seat of fungus hæmatodes, and when this disease extends to them; but I have observed them to be wasted, to become much less distinct than usual, and to be changed into a softish brown-coloured substance; and Mr. Hey remarks, that the muscles in the neighbourhood of a hæmatoid growth "were become brown and indistinct;" but he does not enter more minutely upon the subject, nor explain in more definite terms, the precise nature of the change which they had experienced. I have seen the muscles of the eye-ball spotted with black matter in melanosis oculi, and also in melanosis of the orbital cellular membrane, which, according to Andral, seldom, if ever, happens; but Trousseau and Leblanc, and many other writers, have attested the existence of decided melanosis in the proper muscular tissue. "In a white horse," say they "which had a melanic tumour on the perineum, some of the muscular masses at the posterior part of the thigh, were found to be much paler than in their natural state: inferiorly they became insensibly confounded with the rest of the muscles proceeding from the ischion to the tibia; on the contrary, advancing upwards, they grew paler and paler, the cellular tissue uniting their fibres became of a greyish colour, and, at last, the muscular fibres themselves, which had become harder and more coherent, and capable of grating under the knife, assumed a tinge of the deepest black, and in this state proceeded to their attachment at the ischion; still, however, preserving their fibrous appearance. Their tissue was dry, and exceedingly difficult to break down, the tendons and aponeuroses had alone escaped the melanic infiltration; and the ischion itself was tinged black to a great depth, and was remarkably friable." Breschet has often witnessed melanic masses in the substance of the parietes of the heart. However, if we examine with great care and precision, those cases in which the proper muscular structure is said to be affected with melanosis, we almost invariably find that the melanic matter is deposited in the cellular tissue connecting together its fibres, and that the muscular structure is not, as in the case mentioned by TROUSSEAU and LEBLANC, converted into a melanic mass.

---

* *Lectures on the operative surgery of the eye,* page 168.

The important practical inference we deduce from the foregoing statement is very obvious—in all malignant affections of the eye-ball, the muscles should be carefully removed, inasmuch as we are never sure that they have not undergone the same morbid alteration more or less extensively; I do not, however, mean to represent that the muscular tissue of the eye-ball is particularly obnoxious to diseased changes of a malignant nature—the cellular membrane of the orbit is much more frequently affected with them.

# CHAPTER XXI.*

## DISEASES OF THE ORBITAL CELLULAR AND ADIPOSE MEMBRANE.

### SECTION I.—INFLAMMATION AND SUPPURATION OF THE ORBITAL CELLULAR MEMBRANE.

The orbital cellular membrane may become acutely inflamed, and, after having given rise to extremely severe symptoms, may terminate in suppuration.

*Symptoms.*—There is at first a deep-seated pulsating pain in the orbit, the eye feels as though it were compressed, there is some intolerance of light, and increased lachrymation; as the disease advances, the pain becomes exceedingly acute, the eye feels much more strongly compressed, and as though it were too large for its socket, it may perhaps become inflamed, or, if not externally inflamed, there will still be great intolerance of light, impaired vision, scintillations, and profuse lachrymation; there will also be severe agony in the head, great constitutional disturbance, a full pulse and furred tongue, with loss of appetite and inability to sleep. At length the pain increases to its severest extent, both in the head and orbit; the eye feels as though it would burst, it is very prominent, and most probably inflamed, or the cornea and the humors may be dull and cloudy; the palpebræ are tumid, of a dark colour, and their vessels are prominent, enlarged, and distended, and the constitutional symptoms are all much aggravated. Finally, the eye is protruded, the lids enormously swollen, very probably the cornea sloughs, and the humors of the eye are discharged: and, on separating the lids, there will be perceived a fluctuating tumour bulging forward at some part or other covered by the conjunctiva. As soon as suppuration occurs, the pain is diminished, and shivering takes place, just in the same way as we notice the occurrence of rigors when an extensive inflammation in any other part terminates in purulent secretion. At the period to which I have just referred, the pain is much diminished, but the eye is still more protruded than before, but it is not pushed directly forwards, but, according to the pointing of the matter, it may be forced either upwards or downwards, or to either side. However, the matter may point at one or more places, and this will be discovered by an examination of the eye whenever we are enabled to separate the lids to a sufficient extent to expose it fairly; but we cannot always do this, for the eye-lids may be excessively swollen, and then we must rest content with eliciting that information an examination through the lids enables us to obtain. I need scarcely say that this disease is always very painful, and that it is by no means devoid of danger, for GUTHRIE and others have recorded instances in which it has proved fatal by causing mischief in the head; however, the pain which attends it, is always materially augmented when the eye becomes simultaneously inflamed. Without much inflammation the cornea will sometimes slough, especially when the eye-ball is much protruded, and the contents of the globe will be discharged.

---

* I do not think it necessary to devote an additional Chapter to the consideration of the diseases of the bones of the orbit and their periosteal covering. Inflammation of the orbital periosteum rarely takes place except in connexion with rheumatic affections of the eye. The aggravation of pain, and extension of uneasiness towards the back of the orbit, this inflammation will occasion, have been mentioned in the Section on "rheumatic sclerotitis." Of course, the orbital periosteum is liable to those diseases which affect the same texture in other situations—it is therefore liable to become affected with scrofulous and syphilitic diseases; and it is also liable to accidental injury. When deposition takes place to any great extent between the orbital periosteum and the bone, it will, according to its size and situation, protrude the eye, in some direction, forwards, and give rise to some of the symptoms mentioned in my remarks on "protrusion of the eye-ball."

*Causes.*—The causes of inflammation of the orbital cellular membrane, are, generally, various forms of local injury, such, for instance, as the introduction of a foreign body within the orbit, the removal of a tumour from that part, and so on, and military surgeons are very familiar with this painful disease, occasioned by gunshot, bayonet, and other wounds of the orbit.

*Treatment.*—The treatment should be of the most active antiphlogistic description. Bleeding from the arm, and the application of leeches around the orbit should constitute the first part of the treatment, whenever the case is seen sufficiently early; the diet should be lowered, the bowels well purged, and every part of the usual antiphlogistic treatment should be rigorously pursued. If the cornea is about to slough, if the eye-ball is much protruded, and the patient experiences intense suffering from the pressure from behind, it would be necessary to puncture it, and permit the humors of the eye to be discharged; that is, of course, when the eye-ball is so far affected, that collapse of that organ would ultimately occur whether it were punctured or not. If we are so far unable to subdue the inflammatory affection of the orbital cellular membrane as to prevent the occurrence of suppuration altogether, we may diminish its extent, and it is of the highest importance that any matter which has collected in any *material* quantity should be discharged without delay; and we shall be apprised that it has so collected by the diminution of pain, by the occurrence of shivering, and by the impression of fluctuation, either by examining the state of parts through the lids, when they are not too much swollen, or, if the tumid condition of the palpebræ will admit of it, by instituting a careful examination, after having separated them and exposed the globe of the eye freely. In determining the site of this puncture we must be guided by the situation at which the matter has pointed; if it has pointed at one or more places, it would be better to make the puncture at that part where the pointing is most prominent; if it has pointed at several parts pretty equally, it would be proper to select that part which was most depending; and if, from the swollen state of the lids, we were compelled to puncture it through them, it would be right to make the puncture in a direction corresponding with the folds of the integument and the fibres of the orbicularis muscle.

The course of this disease is usually very rapid, as its symptoms are remarkably severe, but there is, what may be termed, a chronic inflammation, followed by a slowly formed suppuration of the orbital cellular membrane, all the symptoms of which are milder; the progess of which is slower; and particularly the protrusion of the eye-ball, which takes place very slowly and gradually indeed. The treatment, however, is the same, except that it need not be so energetic, and, in the event of suppuration occurring, the rules already laid down, when speaking of acute inflammation of the orbital cellular membrane, will still guide us in determining the spot at which the matter should be discharged, and in fixing upon the time at which such discharge of matter should be accomplished.

Acute inflammation of the orbital cellular membrane generally terminates in the effusion of serum or pus, but it may merely indurate the cellular texture, or it may cause it to slough. Of the first of these occurrences little need be said, for the serum is absorbed soon after it is secreted, so that we have to do little more than attend to the early symptoms of the case—the inflammatory symptoms, and, in proportion as they are lessened will the amount of effusion be diminished. The secretion of pus behind the eye-ball being generally a consequence of a much higher degree of inflammation, is usually preceded by more severe symptoms, it is rarely absorbed, and its presence gives rise to serious inconveniences, and sometimes even to symptoms dangerous to life. The pressure upon the globe, the protrusion of the eye-ball and eye-lids, are but some of the evils it produces. The optic nerve and the muscles of the eye-ball may be put upon the stretch, the bony walls of the orbit may yield or become absorbed, and consequences of a most perilous nature may follow. Sloughing of the orbital cellular membrane is apt to succeed extensive suppuration, and the dead cellular membrane is occasionally discharged in shreds from an opening in the conjunctiva, which should always be of considerable size, and made in a situation which admits of its easy discharge. Induration of the orbital cellular membrane is much more likely to result from mild and chronic, than from acute inflammation. I do not mean to say, however, that the induration in question bears any analogy to scirrhus, but that it is precisely in that state in which the subcutaneous cellular membrane is frequently found after repeated attacks of erysipelas. I have before me a letter from a medical friend in which he states, that the orbital cellular membrane was increased in quantity and much indurated, in the case of a gentleman, who, for the last three years of his life suffered no pain in the eye or its neighbourhood. I saw this gentleman some years ago in consultation; he suffered at that time from suppuration of the eye-ball, consequent, as I thought, on gonorrhœal ophthalmia; the eye-ball was prominent as well as tense, the eye-lids projected, and there was also a good deal of chemosis, and the pain he endured was truly dreadful. I made a free opening in the front part of the eye-ball, and discharged its contents, with the effect of, as he expressed it, " placing him in heaven."* In this case it appeared to me that the external inflammation had extended until it had involved the orbital cellular membrane, and that the eye was probably protruded, partly by the turgid and inflamed state of parts behind the globe, and partly by effusion which, eventually becoming absorbed, had left the texture in a state of induration. Can we feel surprised at the torture such a person would experience—suffering, as he would do, on the one hand, from tension of the eye-ball, arising from an increase of its contents; and, on the other hand, from pressure and tension, produced by an enlargement of the parts within the orbit, and by the partial protrusion of the globe?

CASE I.—*Acute inflammation of the orbital cellular membrane produced by gonorrhœal ophthalmia.*—Lewis JAQUES, æt. 51, residing at Bordesley, called upon me whilst suffering from gonorrhœal ophthalmia, which first appeared about four days since. The eye-lids were excessively swollen, and very vascular; there was so much chemosis present, that it was impossible to obtain a sight of the cornea. He suffered very severely from compression of the globe, and he said that his eye seemed as though it were about to be forced from its socket. It appeared to me that he was suffering less from tension than compression of the globe. I directed him to be bled, to apply a quantity of leeches above the eye-brow, and to foment the eye freely with a strong decoction of poppies. I also scarified the chemotic surface, and discharged a good deal of serum and blood. On the following day, I called upon him, for he was quite unable to visit me. All the symptoms were aggravated, the eye was prominent, the eye-lid enormously swollen and almost livid, and the chemotic enlargement was pushed between the palpebræ. He was a man of great firmness, but he declared that the pain he suffered was truly horrible—and his appearance fully confirmed his statement. I made a short incision at the external canthus so as to lengthen the intertarsal slit, and, at the same time, very freely and deeply scarified the chemosed conjunctiva, with the effect of discharging a good deal of blood and serum, and lessening his sufferings in a very material degree. I had very little trouble with the case afterwards, although the eye was eventually destroyed by the detachment of a slough of the cornea, and by the discharge of its contents.

---

* The expression at least serves to show that the relief from prolonged and horrid suffering, produced by the operation, was perfect and instantaneous.

It appears to me, that this was a case of acute inflammation of the orbital cellular membrane, which was produced by the inflammation of the cellular texture at the front part of the eye. From the relief which was afforded by the division of the skin at the outer canthus in this instance, I am now in the habit of adopting the same surgical proceeding in all cases where there is either great tension or a sense of compression of the eye-ball, with protrusion, swelling, and lividity of the palpebræ.

The following example well illustrates the course and severity of inflammation of the textures—adipose, cellular, and periosteal—situated behind the eye-ball.

Case ii.—" —— a female aged 33. I saw her on the 23d of October, 1833, and found her complaining of most agonizing and deep-seated pain in the left eye, or rather in the orbit, extending to the head;—so intense, that during the night she was quite delirious; the conjunctiva was a good deal inflamed, and the eye-ball protruded forward, with a feeling of much tension; the iris was slightly contractile, and vision somewhat impaired; the eye-lids were distended, and unnaturally protuberant; and the pulse was strong, full, and beat 120. She was bled from the arm to thirty-five ounces, and six leeches were applied to the eyelids; she had a dose of calomel and rhubarb at bed-time, and jalap on the following morning; and saturnine lotions were applied to the eye after the bleeding.

24th. " The local symptoms were more aggravated; the palpebræ were red on the surface, much swollen, and œdematous; the globe of the eye was more protuberant, and the least attempt to move it caused the most excruciating pain; the iris was quite immoveable, and vision gone; the constitutional symptoms were considerably relieved. The leeches had bled freely, and the medicine operated well. She had a blister applied behind the ear, and ten leeches to the eye-lids.

25th. " Very much the same. Had the aperient medicine repeated, as also the leeches, and to continue the saturnine applications.

26th and 27th. " Symptoms not in the least relieved, and the protrusion of the eye-ball still greater. Took twelve ounces of blood from the temporal artery; applied the leeches again to the palpebræ; a large blister to the forehead and temples; scarified the conjunctiva (which was much inflamed) very freely, and repeated the aperient medicine at bed-time and in the morning, and also ordered an antimonial mixture to be given every two or three hours.

28th. " Last night the suffering was so extreme, that she was unable to lie down, having sat up all night supported by pillows; early in the morning, of her own accord, applied again nine leeches, which bled freely. Had the aperient medicine repeated at bed-time and in the morning.

30th. " The pulse became small and feeble; the eye-ball dreadfully protuberant, but pulsation distinctly felt by the patient deep in the orbit; the bowels were operated upon well, and the febrile symptoms almost abated. Ordered a large warm poultice over the eye.

Nov. 1st. " During the night an abscess burst through the upper eye-lid, near to the inner canthus, external to the *conjunctiva*, and discharged a considerable quantity of healthy purulent matter. Through the opening a probe could be passed over the eye-ball, towards the external canthus, deep into the orbit. The pain was much alleviated, but the eye still very protuberant, and the eye-lids red and œdematous. I directed a poultice of turnip to be applied over the eye.

2d. " The opening still discharges a good deal of matter; the painful symptoms a good deal relieved. The bowels are regular, and the tongue clean. She was ordered two glasses of wine daily, and to continue the poultices.

3d. " During the night another opening formed through the lower eye-lid close to the inner canthus, through which a probe could be passed below the eye-ball to the external canthus of the orbit, and matter was discharged freely from the opening.

" From this date she had no bad symptoms. The poultices were continued for several days, then simple dressing, and a zinc lotion, and she recovered remarkably well, with vision quite perfect, but the eye easily fatigued."*

DEMOURS has related the following interesting case of inflammation of the orbital cellular membrane, which terminated in the copious secretion of pus:—" Je parlerai cependant ici d'un dépôt qui se forma subitement derrière

---

* *Edinburgh Medical and Surgical Journal*, No. 122, page 4.

le globe de l'œil gauche de Madame H——, âgée alors de soixante ans, qui vit encore au moment où j'écris et qui ne s'est jamais ressentie, depuis prés de dix-sept ans, des suites de cette maladie, pendant laquelle je lui donnai des soins dans les trois premiers mois de 1801. Elle eut, de deux jours l'un, une fiévre tres forte, qui diminua au troisième acces, lorsqu'un dépôt parut sous le tissu cutané, qui recouvre le sac lacrymal. On aurait pu le prendre pour un abcès dans cette cavité, si le globe n'eût point été déplacé. Ce dépôt s'ouvrit, et il en sorti du pus et des matières très-épasses. L'œil rentra graduellement; mais cet écoulement ayant diminué, le globe ressortit un peu: je ne fis rien que maintenir dans l'ouverture une sonde d'argent á l'aide d'un morceau de taffetas agglutinatif. On l'ôtait matin et soir. Le dixième jour, il s'était fait une seconde ouverture un peu au-dessous de la première. La guérison a été aisée et complète, et la nature a fait d'ailleurs presque tous les frais du traitement, aideé de quelques précautions générales."*

## SECTION II.—ŒDEMA OR SEROUS INFILTRATION OF THE ORBITAL CELLULAR MEMBRANE.

Œdema or serous infiltration of the orbital cellular membrane may take place, and is not an unusual effect of chronic inflammation. It rarely proceeds to any important extent, and is not marked by any very acute symptoms.

---

* *Traité des maladies des yeux*, Tome i. page 93.—Another instance is related by the same author in which the matter was discharged by an external opening, which was maintained by means of a piece of bougie, in order that the parts beneath might be injected for the purpose of causing the wound to heal from the bottom. *Ibid.* Tome ii. page 34.

There is generally present a slight prominence of the eyeball, with a certain amount of pressure and tension of that part, and some degree of pain or uneasiness in the orbit. I have known it occur in connexion with general anasarca; I have also known it follow slight blows upon the eye, and take place in consequence of chronic inflammation. Unless it be exceedingly troublesome, or more than usually large in quantity, it would be better not to interfere, but rest content with employing, in the event of its being connected with general anasarca, the usual remedies for the cure of the more important malady; and, when originating in chronic inflammation, or arising from local injury, the ordinary remedies for diminishing inflammatory action, such as bleeding with leeches, purgatives, and so on, will be proper. I have once been obliged to divide—deeply and freely divide—the conjunctiva, and to permit the fluid behind it to flow through the aperture, but this procedure is quite inadmissible unless under the peculiar circumstances already pointed out, on account of the risk of exciting acute inflammation of the orbital cellular membrane; but, in the case to which I refer, it was absolutely required, in consequence of 'the large amount of fluid, which had collected.

## SECTION III.—SCIRRHUS OF, AND VARIOUS MALIGNANT DISEASES DEVELOPED IN, THE ORBITAL CELLULAR MEMBRANE.

The orbital cellular membrane is liable to become affected with scirrhus. Sometims this occurs alone, but it is more generally connected with scirrhus of the eyeball. I have never seen the orbital cellular membrane affected with scirrhus after it has been acutely inflamed,* nor has it ever existed, under my own observation, on both sides at the same time. The disease is not very painful at its early stages, its progress is remarkably slow, and it is only after it has existed for many years that it induces a scirrhous change in the eye-ball and in neighbouring parts, that it begins to impair the health, to implicate the constitution, and to cause a degree of suffering which renders necessary the free administration of narcotics. At the same time that the orbital cellular membrane becomes indurated, it also becomes increased in quantity, so that, in one or two instances, it has nearly filled the orbit, producing a good deal of pain, in consequence, as it appears to me, of the pressure of the indurated matter upon the optic and other nerves. This pain does not always continue to increase as the disease advances, and this, I imagine, is owing to the previous pressure having caused the absorption of every part of the medullary matter of the optic nerve, only leaving its comparatively insensible neurilemic covering.†

---

* This opinion does not correspond with the experience of Mr. Guthrie. He says "if the orbital cellular membrane, having been indurated by inflammation, should degenerate into a scirrhous tumour, extirpation of the whole contents of the orbit offers the only, although doubtful, chance of safety." *Lectures &c*, p. 166.

† The following interesting dissection of a mass of indurated matter removed from the orbit is given by Mr. Lawrence:—"The mass removed from the orbit consisted of the collapsed and shrunk eye-ball in front, with a hard and incompressible substance behind, extending to the point, at which the nerves and vessels had been divided. The recti muscles, unaltered in colour or texture, covered this substance, the exterior of which had the usual appearance of the orbital fat, except that it was more dense. An incision was carried from before backwards, directly through the centre of the entire mass. An apparently recent coagulum of blood separated the sclerotica from the choroid coat, the latter, with the retina, being compressed by the coagulum into a thick cord, extending from the optic nerve to the iris. There was no trace of the humours. The sclerotica was unchanged: the morbid

*Treatment.*—At the early stages of the disease, where its real nature is merely suspected, narcotic fomentations to the eye, such as a poppy decoction, an aqueous solution of opium, &c., would be proper: it would also be adviseable to apply leeches in its neighbourhood, and to administer the carbonate of iron in drachm doses two or three times a day, with a pill in the evening, consisting of three grains of blue pill, and four of the extract of henbane. When the true nature of the disease is more unequivocally manifested, it would be necessary to have recourse to the extirpation of the orbital contents, taking care, in performing the operation, that the bony texture is well cleared, and that no portion of disease is left behind.*

Melanosis has been witnessed in the orbital cellular membrane on several occasions. In a case of melanosis of the eye-ball which was extirpated, I had an opportunity of seeing a recurrence of disease in the orbit, although the diseased growth had been very completely taken away. In other instances, the melanotic affection has *first* appeared in the cellular membrane of the orbit, and has not at all implicated the eye-ball. Fungus hæmatodes has never, under my own observation, originated in the orbital cellular membrane, although that texture is involved in the course of its progress. In fact, the whole cavity of

---

growth adhered to it closely behind, and the optic nerve proceeded through the centre of the mass. The latter was a dense compact structure of scirrhous firmness, resisting the edge of the knife; its exterior consisted of a light grey texture, very much like that of a scirrhous breast, while in the interior this was intermixed with a light yellow, yet firm substance, resembling what is seen in scrofulous diseases." *A treatise, &c.*, p. 679.—MR. LAWRENCE does not consider the disease to have been of a scirrhous nature.

* MR. WARNER relates the particulars of a case of scirrhous formation in the orbit, which he successfully removed. He afterwards mentions that "there is sometimes a species of *schirrous tumour* within the orbit, where the operation (of extirpation) may be attended with success." *Cases in surgery*, page 110. London, 1784.

the orbit is oftentimes observed to be filled with a fungoid growth at the latter stages of fungus hæmatodes originally affecting only the eye-ball.

## SECTION IV.—TUMOURS IN THE ORBIT FOR THE MOST PART DEVELOPED IN THE ORBITAL CELLULAR MEMBRANE.

A great variety of tumours form within the orbit, and they are chiefly developed in its cellular texture; the symptoms to which they give rise vary chiefly with their situation and size. In all instances they push the eye forwards, produce impairment of vision by pressing upon, or stretching the optic nerve; and, in the majority of instances, excite inflammation of the eye-ball. There may be tumours of almost every known description, both simple and malignant, in this situation. The tumours which most frequently occur, are the osseous, steatomatous, sarcomatous and encisted.

*Situation.*—Almost all the tumours which form within the orbit are developed in the orbital cellular membrane, except those of an osseous nature. They may, however, be formed at any part of the orbit, at its upper or lateral parts, or directly behind the eye-ball.

*Symptoms.*—When a small tumour is placed immediately behind the eye-ball, it occasions very little inconvenience at first. By slightly compressing the globe, it may, in a certain degree, impair vision, and by bringing the retina nearer to the cornea than it ought to be, it may occasion a little far-sightedness. As it increases, the eye will become evidently pushed forwards, pain will be occasioned by the stretching of the optic nerve and the tension of the globe, and sight will become very defective. Perhaps, also, the eye may be a little inflamed. At a subsequent stage of the affection, the symptoms will all become aggravated. The protrusion of the globe will be considerable, the eye-lids will be pushed forwards, and will probably be œdematous, swollen, and vascular. Vision will be exceedingly indistinct. The eye will be more or less inflamed, and the cornea will also be a little hazy, just as it is when its degree of vitality is lowered. Sometimes the pupil will be of a dull green appearance. Sometimes the deep seated textures of the eye will be rendered very vascular, and pushed towards the cornea, as though the back part of the eye were indented or rendered concave on its outer surface by the pressure of the tumour, and then it is possible that the eye may present an appearance which would lead to a temporary suspicion that it was the seat of malignant disease. There will now be a good deal of pain produced by the manner in which the optic nerve and the muscles of the eye-ball are kept upon the stretch.

*Effects or consequences of the existence of tumours within the orbit.*—The stage of disease, beyond that just described, will generally involve very serious consequences. The eye-ball is almost pushed without its socket; pus is effused within it and between the lamellæ of the cornea; the cornea ulcerates or ruptures, and the contents of the globe are discharged. After this occurrence the patient generally enjoys a short period of relief. If the nature of the disease—if the cause of the pain and inflammation and protrusion of the eye-ball—were previously doubtful, it is no longer so now; but it may happen that a timid and inexperienced surgeon may not advise an operation, or the patient may not submit to it if it be recommended. In either case, more serious evils than any that have yet occurred may now take place. The tumour may cause the enlargement and expansion,[*] or the absorption[†] of the bony walls of the orbit, pressure upon, or inflammation of, the brain may arise, and death may speedily supervene. The extent to which the separation and absorption of the walls of the orbit and adjacent parts takes place, before it causes the destruction of life, is, in some instances, very remarkable.

A tumour may be seated at almost any part of the orbit, and not at its posterior part, and, in such instances, it will generally force the eye in an opposite direction to that in which it is situated; thus, if it be placed at the upper part of the orbit, it will thrust the eye downwards, and so on. If the tumour be placed within the orbit, midway between its anterior margin and the optic forramen, it will not only push the eye to the opposite side of the orbit, but will also protrude it, but if it be seated more outwardly —nearer to its edge—then it may happen that the tumour may cover the eye, may so come in front of it as to conceal it entirely.[‡]

*Treatment.*—In all cases of osseous growths from the orbit, it appears to me that our only means of cure consist in having recourse to an operation—the surface of the tumour must be freely exposed, and it it must be removed by a strong scalpel, bone knippers, small saw or chisel, just as circumstances (such as the size, situation and hardness of the tumour) may render the one or other of these instruments preferable. The cure of steatomatous tumours may be attempted, when a part of their surface may be felt through the skin of the eye-lid, by rubbing upon them mercurial and iodine ointments, but if they continue to increase, we shall be compelled to remove them by an operation. For this purpose we select that part where they are most readily felt and perceived, and if a pretty good part of their surface may be seen through the conjunctiva, we may lengthen the intertarsal slit, by an incision at the outer canthus, so as to enable us to raise the lid more completely, and then cut through the conjunctiva, fix a double hook in the tumour, and, by carefully dissecting away its cellular attachments with a round-pointed scalpel, and at the same time keeping it pretty tightly on the stretch, we may often remove them, with little pain, or hæmorrhage, or difficulty, in an entire state. If the tumour cannot be seen or conveniently got at by dividing the conjunctiva, it would be better to remove it through the eye-lid, and, as a general rule, a free incision through its entire texture made parallel with the tarsal margin, is to be preferred; sometimes, however, it is necessary, on account of the form and size of the tumour, to make the external incision perpendicular to the tarsal margin, and it may even be requisite, in order to have sufficient room and to expose the surface of the tumour very completely, to make a crucial incision and to dissect back the flaps.

---

[*] LANGENBECK. *Neue bibliotheck für chirurgie und ophthalmologie*, vol. ii. page 244.

[†] The absorption of the orbit, occasioned by the continuance of an increasing tumour in the orbit, appears to have led to the opinion that the tumour proceeded, in the first instance, from the brain. Such appears to be the explanation of the following statement of WARNER. —"When the eye is thrust out of the orbit by a subjacent tumour, the tumour frequently takes its rise from the brain itself." *Cases in Surgery*, page 109.

[‡] See an extraordinary instance of this kind related by DR. BOUTTATZ, in the sixth volume of the *London Medical and Pysical Journal*, (page 289). He says "the excrescence depended from the eye in the form of a bag. This bag was seven inches and a half long, and three inches and a half in circumference." The Doctor's communication is accompanied by a plate (representing the magnitude and form of the diseased growth) which is at least as "extraordinary" as the case itself.

Encisted orbital tumours may be treated by operation in various ways. They may be punctured and their contents discharged. The cist may be removed only in part, or it may be entirely taken away.

I have never been able to effect the cure of the cartilaginous, or the adipose, or the common sarcomatous and steatomatous tumour within the orbit, without removing them by a surgical operation; but we may sometimes cure the encisted tumours by puncturing the cist, and discharging its contents, or by removing a portion merely of the cist.

It is always better to remove solid tumours which form within the orbit (such as the adipose and common steatomatous) without dividing the skin of the eye-lid, if that be possible; for this purpose, after having lengthened the intertarsal slit (if the size of the tumour require it) we have the palpebræ separated by an assistant, and divide the conjunctiva pretty freely at that part where it is reflected from the lid to the eye-ball, and at that point where the tumour is most easily discovered, and most prominent; then carefully cut through the cist, and part of the solid tumour will generally protrude through the aperture, if not, lay hold of it with a pair of hooked forceps, and endeavour to withdraw it, and afterwards remove the cist in the same manner, if it can be done readily—by the employment of mild traction with the forceps. But the tumour may be too firmly attached to be so removed, and it may be necessary to dissect it out, which, of course, is rather difficult of execution; but, as its cellular connexions with surrounding parts are not very firm, this may be accomplished by a patient and careful dissection. The cist (for they generally possess one) of these solid tumours is not always well defined: it may consist of the surrounding cellular tissue, which has been condensed by its pressure, and then, although such cist is firmly connected to surrounding parts, it is by no means firmly connected with the tumour itself. The tumour may have a well defined cist from its commencement, and then the reverse generally takes place, that is, the tumour is closely and intimately connected with its cist, but the cist itself has merely a very slight connexion with the cellular tissue around it. Such are the general circumstances connected with the degree of intimacy of connexion subsisting between the tumour and its cist, and the cist and the surrounding cellular tissue.

If the tumour be encisted, we may first puncture it, and if, after having punctured it on several occasions, its cist still remains, and is rapidly re-filled, we may attempt its removal wholly or in part, in the manner I have just pointed out, first emptying its cist, and afterwards essaying its complete removal, partly by the aid of the scalpel, and partly by traction with the forceps. I do not recommend much poking in removing tumours from this part, however difficult their removal may be; for, if they cannot be easily removed in an entire state, it would be better to remove them only in part, for, I am well aware of the severe and dangerous nature of that extent of inflammation of the orbital cellular membrane which such manœuvres are apt to excite.

After an operation for the removal of a tumour from the orbit, it is necessary to bring the edges of the wound in the skin together by means of one or two very fine sutures, to apply a little lint to its surface, and only a very light bandage. The patient's apartment must be darkened, both eyes must be kept closed and quiet. The patient must be particularly requested not to raise the eye-lids, or to move the eyes in any direction. The diet must almost altogether consist of tea and coffee, and very weak broth, which should be given to the patient in a proper "feeder." During the progress of the case various symptoms *may* arise which may require especial attention.

1.—In the first place, if a quantity of pus be allowed to collect, and air be admitted to it, it may become putrid, and may give rise to a very alarming degree of irritative fever; or the operation itself may originate severe inflammation of the orbital contents, which may affect the periosteum of the orbit and the neurilemic covering of the optic nerve, which inflammation may, by a mere act of extension, affect the brain.

2.—The external wound may heal, and the secretion of the sore within may continue and become confined; this may give rise to the symptoms produced by suppuration of the orbital cellular membrane—to all the symptoms of proptosis.

3.—Sometimes the eye-lid becomes seriously inflamed together with the orbital cellular membrane.

4.—After the removal of a tumour from the orbit, a sinuous ulcer, having a fistulous aperture, may remain, which may be a considerable time in healing.*

OSSEOUS TUMOURS.—The bones of the orbit are not especially liable to disease.† Exostosis sometimes takes place, and instances are recorded where such growths have acquired considerable size. Tumours of this nature generally form towards the anterior aperture of the orbit, and are distinguished by the slowness of their progress, the slight degree of uneasiness which attends them, and also by their very great hardness.

CASE I.—*Exostosis at the inner part of the orbit cured by the application of caustic.*—" Une femme de trente ans, attaquée d'une fistule lachrymale, avoit, souffert infructueusement une opération qu'on croyait propre à cette fistule. Les os se gonflerent: et quinze ans après, l'exostose l'os planum et de l'apophyse angulaire interne du coronal avoit acquis le volume d'un œuf. Le globe de l'œil comprimé latéralement avoit été jetté hors de l'orbite, et il pendoit en quelque sorte sur la joue du côté du petit angle. M. Brassant attaqua cette exostose avec un caustique; elle suppura, et il obtint dans un traitement de trois à quatre mois, l'exfoliation d'une portion considérable des os tuméfiés. L'œil se rétablit dans sa place naturelle, et la guérison fut parfaite quelque temps après."*

---

* Directions for the management of fistulous wounds of this description are given by DEMOURS, (*Traité des maladies des yeux.* Tome ii. p. 42,) and GUTHRIE, (*Lectures on the operative surgery of the eye,* page 157.)

† " Exostosis from the bones of the orbit is very rare; I have seen only two instances of it." GUTHRIE. *Lectures, &c.,* page 164.

Case II.—*Osseous excrescence at the inner part of the orbit cured by the use of caustic.*—" Olof Laitin, a peasant, born of healthy parents, and himself of a robust constitution, was, in the thirty-fifth year of his age, seized with violent pains in his head, accompanied with an inexpressible heat, shootings, and irritations, chiefly over his eyebrows. At the end of a month there suddenly appeared betwixt the nose and the right eye, a hard nodus, of the bigness of a small bean, with an aqueous liquor copiously issuing from that eye.

" This osseous excrescence increased, and, during its growth, the eye-ball was insensibly forced from its natural position, so that, at length, it came to project out at the opposite corner of the eye, and was a disfigurement not to be viewed without disgust; the tubercle, in the mean time, was surrounded with a pus continually dripping at his right nostril. As the excrescence enlarged, the sight of the eye grew weaker, till it was very near a total extinction. A camp-surgeon in the neighbourhood, was for taking out the bone by exfoliation, but the wound beginning to bleed extremely, and the patient fainting under the severity of the operation, it was judged adviseable to desist. In December, 1736, Olof Ikain, a peasant of Pixema, noted for his cures, offered to try his skill for the relief of the poor man, beginning with an incision round the bone, which also caused a great effusion of blood, and afterwards applying to it something carefully concealed, but, the day following, so violent in its operation that without help the patient could not go from one room to another. After twelve days of exceeding pain, attended with deliquiums, he grew tolerably well, and some months after, in the spring 1737, had the courage to venture a second time on the erosive, but with the like excruciating consequences.

---

* *Mémoires de l'académie royale de chirurgie.* Tome. v. p. 170.

"In March, 1738, this osseous congeries dropt off of itself, the pain immediately ceased, the eye mends daily, and is gradually returning to its socket."*

CASE III.—*Osseous tumour at the upper and inner part of the orbit rendered carious by surgical operation, and subsequently removed by means of a strong pair of forceps.* —"A. D., a farmer's daughter, 28 years of age.

1st *October*, 1802.—"Covered with the upper lid of the left eye, there is a very hard tumour, of an oval form, and rather flat, somewhat more than an inch in its perpendicular diameter, and extending horizontally, about an inch and half in length, from the inner angle of the orbit towards the eye-ball, which is displaced. It seems to occupy the greater part of the socket, and has forced the eye itself forwards and outwards, so that the eye hangs pendulous and loose, and apparently entirely beyond the exterior edge of the outer angle of the orbit. The optic nerve and muscles must be considerably elongated, perhaps nearly an inch. She can still, however, discover objects with this eye, although its sight is much impaired; and she complains of little pain from the tumour, even when pressed or handled pretty freely.

---

* *Medical, chirurgical, and anatomical cases and experiments;* Communicated by DR. HALLER, and other eminent Physicians, to the Royal Academy of Sciences at Stockholm. Translated from the Swedish original. Page 4. London, 1758.

2nd *October*.—" Being certain that the examination would be attended with no danger, but might be productive of good consequences, I resolved to ascertain the nature of the tumour, which, although hard, appears somewhat loose. With this view, I made a horizontal incision through the upper eye-lid, about an inch in length, along the greatest diameter of the tumour, which, on separating and raising the edges of the wound, was discovered to be a solid piece of bone, covered only with the common integuments, and a thin membrane somewhat resembling periosteum, and to which it was but slightly attached. No part of the bones of the orbit was denuded; and although the manner of its adhesion to the neighbouring parts could not be ascertained, the tumour remained firm and immoveable, notwithstanding considerable efforts were made to loosen it, and bring it away.

" The wound made by the incision did not heal up, but continued nearly of its original size, discharging a small quantity of thin matter, neither purulent nor fetid. The bone continued to increase in size; the eye was still more pressed out of its natural position, though some degree of sight still remained in it, and the girl continued in perfect health. At length, towards the end of September, 1803, the bone became carious, and evidently loose, and protruding somewhat forwards, I endeavoured to extract it by making, with a small scalpel, an incision round the edges of the former wound, to detach it from any adhesion at its orifice, and by taking firm hold of it with a pair of strong forceps. The first attempt failed, but a second, made some days afterwards, succeeded; and I extracted, without much exertion or difficulty, a piece of bone, of an oblong shape, weighing an ounce and two drachms; an inch and a half in length, and two inches five-eights in circumference; hard, solid, and pretty smooth.

"The eye-ball has, in a great measure, recovered its natural situation, and seems still to encroach on the cavity which contained the bone, although for some months past its progress has been but small. She has completely recovered the sight of the left eye, which is now equal to that of the right, and is scarcely more affected by fire or candle light, or by looking stedfastly at any object; the only perceptible difference being, that it begins to water first.*"

SARCOMATOUS, STEATOMATOUS, AND ATHEROMATOUS TUMOURS.—The following are among a few of the many recorded instances of the existence of tumours in the orbit not always very precisely termed, sarcomatous, &c. They satisfactorily illustrate various circumstances connected with their speed of progress, the symptoms they produce, and the operative proceedings it may be necessary to adopt for their relief. It is, however, quite impossible to lay down any rules, which admit of that degree of frequency of application of which similar directions, in reference to the circumstances connected with other surgical operations undertaken for the relief of some other diseases, are susceptible.

CASE I.—*Sarcomatous tumour at the lower part of the orbit, removed by an incision through the lower eye-lid.* —A tumour had existed at the lower part of the orbit for seven years. For some years after the eye became uneasy, the tumour was scarcely at all visible on external examination, but, in its progress, it acquired great size, projecting upon the cheek, without the anterior aperture of the orbit. It forced the eye-ball almost without the orbit, and towards the temple. Dr. Hope removed the tumour by an incision carried through the lower eye-lid, parallel with the tarsal margin, after a tedious and painful dissection. The tumour was of a spherical figure, smooth and even, and consisted of a " carnous substance." In the course of a short time the patient recovered her vision, the mobility of the eye-ball was restored, and scarcely the slightest personal defect was produced, either by the disease, or by the means employed for its removal.*

---

* *Edinburgh Medical and Surgical Journal*, vol. i. page 405.

Case II.—*Immense sarcomatous tumour in the orbit, producing death by injuring the brain.*—" Une femme, âgée de 62 ans, devint sujette à des migraines ; elle sentit un engourdissement autour de l'orbite, qui gagna tout le côté droit de la tête ; elle ressentit des élancemens considérables dans l'œil du même côté, quoiqu' il parût sain ; mais cet œil devint peu à peu louche, et si fort saillant, que dans six mois il fut chassé de l'orbite, vers le sinus sourcillier, après avoir perdu totalement la vue et le mouvement.

" Tous ces accidens furent occasionnés par une tumeur dans l'orbite qui ne paroissoit d'abord que comme une petite dureté assez légère, mais qui, en augmentant peu à peu, fut, au bout de trois ans, la cause de la mort de la malade.

" Les symptomes, qui accompagnoient ce mal, étoient des hémorrhagies excessives par le nez et des menaces fréquentes d'inflammation au cerveau ; mais les plus incommodes furent la perte presque totale de la vue, la surdité et la difficulté de la déglutition.

" Après la mort de la malade, on l'ouvrit pour reconnoître la cause d'une maladie si singuliere. On trouva que la tumeur de l'orbite droite s'élevoit de six à sept lignes au-dessus du nez, qu'elle avoit repoussé du côté gauche; qu'elle remplissoit la moitié de l'orbite et avoit forcé l'œil d'en sortir; qu'elle descendoit jusqu 'aux alvéoles qu'elle avoit tellement gonflées, que la mâchoire supérieure débordoit sur l'inférieure de plus d'un pouse; enfin que la voûte du palais en étoit applatie, et que les alvéoles du côté gauche commençoient à s'engorger.

---

* *Philosophical Transactions*, No. 472.

"Cette tumeur pénétroit jusqu'au-dedans de la tête ou elle s'élevoit de l'épaisseur d'une noix, depuis la selle du turc qu'elle avoit détruite, jusqu' à l'apophyse pierreuse du temporal et au grand trou spinal de l'occipital, dont elle avoit rongé plus d'un tiers de circonférence.

"Elle avoit fondu et converti en sa propre substance tous les nerfs, les vaisseaux et les membranes qui s'étoient rencontrés sur la route, et ce n'etoit qu'une même masse qui pénétroit depuis la joue jusqu'au cerveau.

"La substance de cette tumeur étoit compacte et de coleur blanchâtre, semblable à celle du vieux fromage de Hollande. Elle devenoit moins dure et moins blanche en approchant du cerveau où elle paroissoit être de la même couleur et de la même consistance que les glandes ordinaires."*

CASE III.—*Sarcomatous tumour*† *at the upper and outer side of the orbit, removed by a free incision of the upper lid perpendicular to the tarsal margin.—Return of disease.*—"Within the last twelve months I have extirpated two large tumours from the orbit. The first was in a young girl. The tumour was on the upper and outer side of the orbit. In order to get at it, I was obliged to cut across, perpendicularly, the whole breadth of the upper eye-lid, and dissect back the two flaps. The tumour was nearly

---

[*] *Mémoires de l'académie royale de chirurgie.* Tome v. p. 212.

[†] I have termed this disease sarcomatous. The author says, "the morbid growth was slightly encysted, perfectly organized, and of anomalous texture."

the size of a plum, and reached as far back as the eye-ball. It was slightly encysted, perfectly organized, and of anomalous texture. The healing of the wound was rapid, and, contrary to my expectation, the eye-lid reunited perfectly, and regained very nearly its natural power and extent of motion. The eye-ball did so also, and the vision was perfect. This girl went to England some months after, and I was concerned to learn fron the surgeon under whose care she was, that the tumour had begun to grow again.*"

CASE IV.—*Sarcomatous tumour encircling the optic nerve.—Tumour and eye-ball removed at the same time.*—"The second case was in a young adult woman. The disease was of two year's standing before I was consulted, and had produced hideous exophthalmos. It was found impracticable to extirpate the tumour without also removing the eye-ball, which was accordingly done. The tumour exceeded the size of the eye-ball, lay directly behind it, and so completely encircled the optic nerve, that the latter was diminished one half in thickness by the pressure of the tumour. The vision had been rapidly declining previous to the operation. This tumour was exceedingly hard, of anomalous texture, and surrounded by a layer of condensed cellular substance. The anterior aspect of the tumour touched and pressed upon the posterior aspect of the eye-ball, but had no connexion with it, except through the medium of the optic nerve and of the cellular substance. This young woman has continued well for twenty months, and is in perfect health."†

---

* MONTEATH. Foot note to his translation of WELLER's *Manual;* Vol. i. page 195.

† Ibidem, Volume i. page 196.—MR. WARDROP mentions the case of "a young woman who had a tumour on the orbitar plate of the left frontal bone, the base of which adhered firmly to the bone, whilst the external portion was attached to the integuments, in which there was a small sinus leading into the interior of the tumour. A tumour had

ENCISTED TUMOURS.—I have stated that encisted tumours are more commonly found in the orbital cellular membrane than tumours of any other description; that they are sometimes so situated and connected that it is impossible to remove them in an entire state; and that they are sometimes cured merely by being punctured, as well as by the partial or total excision of the cist itself. The following cases are intended to illustrate the general history of these kind of tumours, and to point out the operative proceedings usually employed to occasion their diminution, or to accomplish their entire removal.

CASE I.—*Encisted tumour in the orbit removed by an incision through the lower part of the conjunctiva. Cist entirely extirpated.*—" A laborious countryman was attacked several years ago with a pain, and consequent dimness of sight in one of his eyes, which, however, continued long without particular attention to it, until about two or three years afterwards, he became quite blind of that eye, the globe being protruded far outwards, until almost the whole inner surface of the lower palpebra was turned inside out, and came downwards over his cheek a very considerable way.

" MR. BROMFIELD, after examining the diseased eye, proposed an operation, and performed it in the following manner, whilst MR. INGRAM acted as assistant to him. In the first place, they covered the sound eye with a handkerchief tied round the head, and then compressed upwards the distorted palpebra, till it was brought as near as possible to its natural position; and thus it was held tight,

---

been extirpated from the seat of this swelling some months previously, a portion of which adhering to the bone being left behind, gave origin to this new growth." The tumour was removed without difficulty, and in order to prevent its reproduction, the portion of bone with which it had been connected, " was rubbed over with the kali purum." *Medico-chirurgical transactions*, Vol. x. page 273.

whilst MR. BROMFIELD cut through the integuments into the lower part of the orbit of the eye under the adnata, till an aperture was made sufficient to introduce his finger behind the globe of the eye, so as by touch, to be able to direct a sharp pointed scalpel, which perforated the substance underneath. Immediately a thin pellucid liquor was discharged, not far short in quantity of a small wine glass full. Here MR. BROMFIELD paused to give the patient a little water to cleanse his mouth from the blood, and observed that his business was not more than half done, until he could extract the cyst which had contained the water. He therefore introduced two small hooked instruments to catch hold of it, and took it completely out. The wound in the orbit was filled with lint, and dry dressings, and these were secured by a proper bandage; but yet, within less than twenty-four hours, the patient's head and neck, a great way down that side, were swelled or inflated to a prodigious size. This symptom, however, was, after some time, removed by enlarging the wound, and dressing it only very lightly with dry lint, and by a few gentle purges; so that thus treated as a common superficial wound, in less than a month the whole was healed, and the poor man was sent home perfectly satisfied."*

It is stated that vision returned after the operation, and that "the eye-lid fully recovered its natural tone, position, and functions."

CASE II.—*Large encisted tumour in the orbit. Prolongation of the cist into the cerebral substance. Puncture of the cist, followed by the death of the patient.*—" Louis BONNET, aged 20 years, enjoying tolerable health, was admitted to the Hospital Saint-Eloi, April 30, 1825. He had, ever since he was eight years old, a considerable tumour, which filled the left orbit, and projected greatly between the eye-lids. Upon attentive examination the following were the appearances:—the lids tightened, very distended as to breadth, were separated from each other by an interval of one inch and a half; their skin thin, and injected. The intermediate space was convex, projecting, red, covered with a conjunctiva very vascular, fungous, bedewed with tears and puriform mucus. The spot wherein the cornea should have existed, presented scarcely any traces thereof, a brownish tinge was the only mark. The sight had been lost many years, and the eye seemed wasted. The projecting mass appeared to be composed of a tumour placed betwixt the muscles of the eye-ball, which moved it, and whose resistance announced a cyst. The tumour fluctuated throughout its extent.

---

* *Medical Observations and Inquiries*, Vol. iv. page 371.

*Operation.*—"We plunged horizontally the blade of a straight bistoury towards the middle of the lower lid, where the tumour seemed most to fluctuate. A transparent citron-coloured fluid was spirted out with great force. We were surprized at the quantity; and still more astonished when, introducing a finger into the cavity, we discovered that the cyst was not confined to the orbit, which, however, it entirely lined; but that it was prolonged into the cranial cavity, through the foramen opticum, which was so dilated as to give free passage to the fore finger. The posterior prolongation of the cyst was plunged into the cerebral substance, whose consistence was easily distinguished. Charpie was introduced lightly into the cavity, and the borders of the wound were parted with a strip of anointed linen."

The patient died in a state of stupor five days after the cist had been punctured.

*Post mortem examination.*—"A prolongation of the cist had plunged into the substance of the inferior portion of the left lobe, about three inches of depth, thrusting before it the pia mater and arachnoid. The cavity of this process contained purulent matter, as did the orbital portion. The optic foramen, situated higher and more backward than its fellow, presented a diameter of more than six lines. The optic nerve had totally disappeared."*

CASE III.—*Encisted tumour in the orbit cured by rupture of the cist.*—" A woman had the globe of her eye protruded. She became a patient of SIR WILLIAM BLIZARD. He was examining the eye one day in order to ascertain the nature of the swelling, and the woman cried out, ' Oh! Sir, if you do not take care you will push my eye out.' He continued to make pressure round the globe, and out gushed a quantity of a fluid, which appeared to have been contained in the cyst, and out popped the eye with it. It absolutely protruded much beyond the edges of the socket. He immediately replaced it, closed the lids, kept the woman quiet, and she recovered."†

CASE IV.—*Entire removal of the globe and an encisted tumour which had caused the absorption of the upper part of the orbit. Patient perfectly cured.*—" John ALBUT, ætat. seven years, in November, 1826, was, without any known cause, affected with protrusion of the right eye, which gradually increased and produced considerable exophthalmia, with total loss of vision, and a great tendency to torpor. On examination, I found that a resisting tumour extended across the orbit, above the globe, the former having the effect of bearing the latter downwards and forwards.

" On the 16th of April, I was again called to see the patient, and found that the tumour had enlarged to such an extent, as to produce coma, still further projection of the eye, and partial paralysis of the left side of the face and upper extremity, with a dilated and immoveable condition of the pupil of the left eye: the parents having finally consented to the operation, I proceeded as follows:—

---

* *London Medical Gazette*, Vol. v. page 110. This case is abridged from the *Chirurgie Clinque* (Vol. ii. page 92) of Professor DELPECH.

† ABERNETHY's Lectures reported in the *Lancet*, Vol. vii. page 13.

"The boy being placed on a table, near the light of a window, I divided the external canthus to the edge of the orbit, and then elevated the upper lid, by which a tumour, elastic and irregular, was exposed, extending across the orbit, and forwards to the supra-orbital ridge. With the handle of a scalpel I detached it from its connexion with the bone, to the extent of half an inch; but found that it so completely embraced the globe, and was so closely lodged in the orbit, that it would be impossible to remove the former without sacrificing the latter; I therefore drew the contents of the orbit downwards and forwards, by inserting a curved needle, armed with a strong ligature, through the edge of the tumour, and globe of the eye; I now cautiously proceeded to detach the tumour at its posterior part, but before I had proceeded far, I was not a little annoyed to find, that what I had anticipated was correct, viz., that the tumour pressed on the anterior lobe of the brain, the posterior and superior part of the roof of the orbit being absorbed; however, I cautiously pursued the separation of parts to the foramen opticum, and finally, divided the optic nerve and recti muscles with a curved scissors. Slight hæmorrhage followed the operation, but was easily restrained by a portion of sponge. In ten days the wound had nearly healed, and the little patient was walking about without any inconvenience."*

---

* Dr. Bushe, in *Lancet* for July 1828.

**Case v.**—*Encisted tumour in the orbit, containing " a compact lardaceous yellow substance," attached to a second cist, containing " a whey-coloured fluid, and partly a yellow curdy substance." Vision perfect after the complete extirpation of the cists.*—" In November, 1812, Thomas **Heard**, a healthy looking young man of 17, was admitted an in-patient of the infirmary for the cure of diseases of the eye, in this city, on account of a tumour which completely obstructed the sight of his left eye. The tumour was situated beneath the eye, occupying a very considerable portion of the orbit; the eye, in consequence, being pushed into the upper part of that cavity, so as to be almost wholly hidden behind the upper lid. On tracing it backwards, it appeared to extend to a very considerable depth; and it projected so much in front, as to constitute a very striking deformity.

"The swelling was first observed in infancy, and was at that time not much larger than a pea. It increased but slowly, until about four or five years since, when it began evidently to enlarge, and for some time it grew rapidly. Latterly, it had not advanced much. It caused no pain, but as it was a great deformity, was still enlarging, and the eye sound, though rendered useless by its presence, it was thought adviseable to remove it.

*Operation.*—" A division was made of the inferior oblique muscle of the eye, which appeared stretched across the front of the tumour, having been pushed before it in its progress from the deeper parts of the orbit. The sac adhered firmly to the outer angle, and part of the lower edge of the orbit: in most other points it was but loosely connected with the surrounding parts. It was found to extend almost to the bottom of the orbit, and to occupy more of it than the eye did itself; and it not being possible to proceed in the dissection far within that cavity, without greatly endangering the eye, on account of the very narrow space between it and the posterior division of the swelling, the contents of the latter were partially evacuated to obtain room; and the sac cautiously separated from its deeper attachments. Towards the posterior point, on the inner side, and more than an inch from the edge of the orbit, the sac felt as if it embraced a sharp bony process, arising from about the line of junction between the ethmoid and superior maxillary bones. Unwilling to proceed at hazard, the sac was cut off close up to this projection, that its nature and connexions might be examined before an attempt was made to remove it. It appeared to be formed of bone, terminating in a sharp point, and projecting nearly in a perpendicular direction into the cavity of the orbit. It was slightly moveable, as if attached to the periosteum only; and was removed without much difficulty, together with the remains of the sac which adhered to it.

"The patient was discharged in the beginning of January, with the wound perfectly healed. The lower lid did not, at that time, cover so much of the eye-ball as it does naturally; and in one spot the ciliary edge was a little inverted. He had the power of moving it slightly, but he could not raise it high enough to bring it into accurate apposition with the upper. The lachrymal ducts of both lids were pervious to fluids, which passed freely into the nose by means of a syringe. There was a considerable hollow above the eye-ball; and the eye was not quite in a line with the other, but rather above it. He could not move it at all downwards, or freely in any direction. With the exception of this inconvenience, he enjoyed in it perfect vision."*

---

* BARNES, in *Medico-chirurgical transactions*, Vol. iv. page 316.

Case vi.—*Encisted tumour at the upper and outer part of the orbit, cured by the excision of a small portion of the front of the cist.**—A farmer's labourer, residing in the neighbourhood of Alvechurch, applied to me with a tumour at the upper and outer part of the orbit, which had been gradually increasing for about ten months. The tumour produced a considerable projection of the eye-lid, and turned the eye downwards and inwards. On raising the lid a round elastic semi-transparent prominence was detected, which had a shining glistening appearance, pretty much as though it were covered by the fibrous expansion of the muscles of the eye-ball. He says, that it has increased slowly, that it has never given him any pain, nor caused dimness of vision until lately. About two years ago a surgeon residing near Alcester, removed a considerable tumour from the situation occupied by the present enlargement.

*Operation.*—I passed an iris-knife into the tumour and discharged a good deal of fluid exactly like olive oil, only a little yellower. The evacuation of this fluid caused the cavity containing it to contract, so that the eye assumed its natural position, its movements were perfectly restored, and vision was greatly improved. In the course of a month the cist re-filled, and I then made an incision through the whole of its front surface, and with the curved scissors cut away a portion of the cist, and, as the conjunctiva was firmly connected with it, a portion of that membrane also. On exposing the inner surface of the cist, (which was of considerable size) it was found to possess a smooth white serous aspect, but it was not very vascular. The fluid secreted on this occasion was exactly like that formerly discharged—it had all the visible qualities and ordinary characters of clear olive oil. I saw this person several times afterwards, and there was no appearance of a return of disease. He was directed to call upon me again if the tumour increased, and I am satisfied he would have done so if it had enlarged in any material degree. As it is now two years since I removed the portion of cist, and as he has not yet called upon me, I am led to conclude that the last operation has been quite successful.

---

* Richerand relates a case of encisted tumour in the orbit, which was cured by the inflammation caused by a puncture of the cist, made for the purpose of ascertaining the nature of its contents. The operator presumed the disease to be cancerous, but, on exposing its surface, after having made an incision at the outer canthus and divided the conjunctiva, he thought proper, before proceeding further, to satisfy himself respecting the nature of the enlargement, by thrusting into it the point of the scalpel. A quantity of white tenacious fluid matter was discharged, and all further operative proceedings were abandoned. The tumour entirely disappeared afterwards. *Nosographie chirurgicale*, Tome ii. p. 92.

CASE VII.—*Cist in the orbit, containing hydatids. Cured by puncturing the cist and discharging its contents.* —" Charles ROWELL, forty-two years of age, was admitted under my care, into the London Ophthalmic Infirmary, on the 3d of January, 1820, with protrusion of the globe from the orbit by a deep seated tumour, which had been growing for seven years.

" When this patient was admitted into the infirmary, the tumour had advanced so far between the upper and inner portion of the eye-ball and the eye-lid as to have thrust the globe completely out of the orbit. The upper lid, greatly stretched and inflamed, covered the eye and the tumour; the lower was completely everted, and its membranous lining appeared as a thick fleshy mass. The conjunctival covering of the globe was thickened by chronic inflammation, the consequence of exposure. The structure of the eye was uninjured; the pupil round, and about in the middle state; the iris motionless. Vision was destroyed. The tumour was firm, and, apparently, affixed to the orbit: it afforded, on pressure, an obscure sense of fluctuation.

" To relieve the distention and pain, and acquire some further insight into the nature of the disease, a puncture was made into the most prominent part of the swelling, and about a dessert spoonful of clear watery fluid escaped. Considerable diminution of suffering ensued. When I examined the part two days afterwards, I found a soft opake white substance in the puncture, and proceeded to remove it with a pair of forceps; it proved to be an hydatid, and a few others escaped when pressure was made on the swelling. Some more came away on the following day, and I afterwards cleared out the whole collection, amounting to half a tea-cup full, by enlarging the puncture and injecting water forcibly into the sac. Inflammation and suppuration of the cyst followed without much pain; the discharge then gradually diminished, and the opening closed in about a month. The eye returned to its natural situation, and all uneasiness ceased. In March, the only traces of the complaint were a loose and wrinkled state of the integuments of the upper lid, and the eversion of the lower, which was gradually diminishing by the application of lunar caustic to the thickened conjunctiva. A little motion of the iris and slight perception of light had returned."*

It will be seen from the preceding cases that—1, encisted tumours in the orbit may be cured merely by being punctured, which, by bringing the sides of the sac together, may cause them to unite, or, by causing a greater degree of inflammation with a copious secretion of pus, will more certainly, though with more pain and some risk, accomplish the same object; that—2, a cure is more likely to occur if a portion of the cist is removed, than if it be merely punctured; that—3, in some cases, even where the tumour, from its situation, its size, and its long continuance, has occasioned absorption of the bony walls of the orbit, and the surface of the cist has been in contact with the cerebral substance, perfect recovery has quickly taken place after the extirpation of the tumour; and that—4, it may happen from the situation and size, and connexions of the cist, that it may be necessary to extirpate the eye-ball and the tumour together.

---

* MR. LAWRENCE in *Medico-chirurgical transactions*, Vol. xvii, p. 48. —A somewhat similar case, cured by puncture of the cist, is related by DELPECH *(Chirurgie clinique*, Tome ii. p. 99*)*, and another, treated with success in a like way, is mentioned by MR. WELDON *(Cases and observations in surgery*, page 104).

It will not, however, be inferred that any operation performed upon the parts behind the eye-ball is altogether unassociated with danger, for inflammation in this situation may readily extend from the orbital periosteum, or along the sheath of the optic nerve, and occasion very alarming symptoms, and even fatal effects. And, besides, the bony walls of the orbit, if not already quite absorbed by the tumour, may be so far attenuated, that, in the attempts to remove it, they may be fractured, or so pressed against the brain as to occasion inflammation or other injury of that delicate part.

## SECTION V.—INCREASE AND DIMINUTION OF THE ORBITAL ADIPOSE SUBSTANCE.

INCREASE OF THE ORBITAL ADIPOSE SUBSTANCE.—The orbital adipose substance may be deposited in unusually large quantity, rendering the eye-ball prominent, producing an uneasy aching sensation of the globe, and causing a certain degree of impairment of vision. It may accompany mere obesity of the system, or, it may arise independently of such general polysarcia, and, whether occurring in connexion with general obesity, or as a mere local affection, the application of blisters, or the formation of a seton, or an issue in the neighbourhood of the part ought to be had recourse to, whenever it excites any material uneasiness, or produces an unpleasant personal defect. Iodine, also, may be administered internally; and the hydriodate of potash, mercurial ointment, or some other sorbefacient application rubbed upon the parts in the neighbourhood of the eye. I have seen this affection in a degree which has caused great protrusion of each eye and impaired vision, and the subject of it has exhibited a very disagreeable and almost frightful appearance. In the few cases of this description I have witnessed, the disease has never been amended by treatment. An increase of the orbital fat does not take place, at least I have never seen it occur, after collapse or atrophy of the eye-ball.

DIMINUTION OF THE ORBITAL ADIPOSE SUBSTANCE.—Wasting of the orbital adipose substance is characterized by a hollow and sunken appearance of the eye, and is very readily discovered, and cannot, as far as I am aware, be remedied. It is not an important affection, although persons who suffer from it, would, no doubt, be glad to get rid of what must be considered a serious personal defect. It may either exist as a temporary or as a permanent affection. I have seen it in connexion with a wasted condition of the system, and it is particularly remarkable in violent fevers, in severe indispositions when characterized by an extreme state of collapse, and under circumstances of acute and prolonged bodily suffering. It is often remarked after abscess of the orbital cellular membrane, and after the removal of a tumour from the orbit, and is, I presume, then dependent on the occlusion of those cells, and the agglutination and consolidation of those membranous surfaces, which formerly secreted and contained the orbital adipose structure.

## SECTION VI.—ANEURISMAL AFFECTIONS IN THE ORBIT.

ORBITAL ANEURISM BY ANASTOMOSIS.*—I have only seen this affection once, and then the patient was not under my own care, no operation was performed for his cure, and he died, as I think, in consequence of the omission of that assistance, which the improved state of surgery has placed us in a condition to bestow on persons suffering from this most distressing disease.

The early symptoms of orbital aneurism by anastomosis are thus epitomized by MR. GUTHRIE.—" The first sensations experienced by the patients (referring to those of MR. TRAVERS and MR. DALRYMPLE) of commencing disease, were a sudden snap in the orbit, followed by pain, and accompanied by a whizzing noise in the head. In a few hours a copious effusion of a limpid fluid took place into the eye-lids, the pain increased in severity, so as to become intolerable. The eye soon began to protrude, and a tumour became perceptible in both cases, evidently of an aneurismal character. The pain was now accompanied by a noise in the head, which one patient compared to the blowing of a pair of bellows, the other to the rippling of water, and both the pain and noise were insupportable, when the head fell below the natural level."†

CASE I.—*Aneurism by anastomosis in the orbit causing death by repeated hæmorrhage.*—" Thomas ARCHER, a stout, robust, young man, about 30 years of age, and of a full plethoric habit, was attacked immediately after an inflammatory fever, with stiffness and throbbing pain in the orbit of the eye; the pain rapidly increased, and in a few days the eye was protruded, and suppurated. Bread and milk poultice, and other mild applications were used; calomel and hemlock were given internally, and hemlock was applied to the part. However, large doses of opium alone gave him relief. The tumour daily increased, very minute vessels ramifying over its surface, and in two months was nineteen inches in circumference; astringents and escharotics were then applied, but their effects were so painful that they could not be continued. Repeated hemorrhages at this time gave him some ease. These were so frequent and so profuse, and were restrained with so much difficulty, that his health gradually gave way, dropsical symptoms came on, of which in a short time he died. Annexed is an engraving of the tumour; situated in the centre is the largest vessel, and the part from whence the hemorrhage chiefly took place."*

---

* This condition of disease is concisely defined by MR. COOPER. He says, the aneurismal tumour " is a congeries of active vessels, and the cellular substance, through which these vessels are expanded, resembles the gills of a turkey cock, or the substance of the placenta, spleen, or womb. The irritated and incessant action of the arteries fills the cells with blood, and from these cells it is reabsorbed by the veins." *Surgical Dictionary*, page 174.

† *Lectures on the operative surgery of the eye*, page 168.

The two following cases comprise an account of the disease,—its origin, progress, extent, and the serious suffering and frightful symptoms to which it may give rise—and of the operative proceedings required for its cure.

---

* *Observations on aneurism and some diseases of the arterial system*, by George Freer, page 32. Birmingham, 1807.—This case is accompanied by an engraving, marked "fungus hæmatoides," but, although it is so designated by Mr. Freer, it is quite evident, from the history of its progress, the age of the patient, combined with the throbbing character of the pain he experienced in the orbit, the ramification of vessels upon the surface of the tumour, (which are represented in the drawing, as being very large) and the great amount of hæmorrhage which took place from them, that the disease was, in reality, "orbital aneurism by anastomosis." Mr. Freer, himself, remarks upon the case "it is not to be doubted that the arterial system of the eye was the chief seat of the disease."

CASE II.—*Aneurism by anastomosis in the orbit, cured by the ligature of the common carotid artery.*—"Frances STOFFELL, on the evening of the 28th of December, 1804, being some months advanced in pregnancy, felt a sudden snap on the left side of her forehead, which was attended with pain, and followed by a copious effusion of a limpid fluid into the cellular substance of the eye-lids on the same side. For some days preceding she had complained of a severe pain in the head, which was now increased to so great a degree, that, for the space of a week, she was unable to raise it from the pillow. The œdematous swelling surrounding the orbit was reduced by punctures; an issue was set in the temple for a smart attack of ophthalmia which supervened, and leeches and cold washes were applied. She now first perceived a protrusion of the globe of the eye which affected the sight, and a circumscribed tumour, elastic to the touch, about as large as a hazel nut, appeared upon the infra-orbitary ridge. Another softer and more diffuse swelling arose, at the same time, above the tendon of the orbicularis palpebrarum. The lower tumour communicated both to the sight and the touch, the pulse of the larger arteries; the upper gave the sensation of a strong vibratory thrill. The swellings grew slowly, and the skin between the eyes and that of the lower eyelid became puffed and thickened. The globe of the eye was gradually forced upwards and outwards, and its motions were considerably impeded. She had a constant noise in her head, which, to her sensation, exactly resembled the blowing of a pair of bellows. The pulsatory motion of the tumours was much increased by agitation of mind, or strong exercise of body. But the most distressing of her symptoms was a cold obtuse pain in the crown of the head, occasionally shooting across the forehead and temples.

She was compelled to rest the left side of her head on her hand when in the recumbent posture, and found the beating and noise to increase sensibly when her head was low and unsupported."

Such was the state of the patient when Mr. Travers first saw her, and he states, that as cold applications and "pressure on the swelling," had been tried in vain, and "being satisfied of the growth of the disease," he resolved on "placing a ligature on the carotid artery."

The operation was performed, and "the patient, before she quitted the table, observed that the pain was numbed, and that the noise in her head had entirely ceased. The small tumour over the angle of the eye was still thrilling, but very obscurely. Two hours after removal to her bed, I found her free from pain, but uneasy from having preserved the same posture."

Mr. Travers remarks, that "four months after the operation was done," the disease was considered, by a gentleman "who had observed its more than usual progress before the operation, to have received a decided check from that period." Two years after the ligature of the carotid, Mr. Travers saw the patient, and he states that "of the disease, a knob of the size of a large pea over the inner angle of the eye is the only vestige that remains."

The following very important circumstance is mentioned by Mr. Travers, as having occurred five months after the operation, and it is impossible to determine how great a share the occurrence of this accidental hæmorrhage had in rendering the cure of the disease so complete as it subsequently became:—"On Saturday, 28th of October, she miscarried at the period of about ten weeks from conception. The hæmorrhage was so considerable as to induce syncope, and leave her in a state of extreme debility. On the succeeding morning, it was observed that the upper tumour was flattened, and the pulsation had altogether ceased."*

CASE III.—*Aneurism by anastomosis in the orbit cured by the ligature of the common carotid artery.*—" On the 24th of November, 1812, Dinah FIELD, aged 44 years, of a delicate and sickly habit of body, came to me with a complaint in the left eye. She said, that about five months since, being then pregnant of her sixth child, she was seized in the middle of the night with an intense pain in the left eye-ball which grievously distressed her. 'The attack was sudden, instantaneous.' That, ' hearing a noise as of the cracking of a whip, and feeling at the same moment an extraordinary kind of pain in the globe of the left eye, she awoke in great alarm, and leaped out of bed.' About ten or twelve hours afterwards, the eye became inflamed, and the eye-lids so much swelled, as to project considerably beyond the level of the upper and lower orbitary ridges. She also felt acute pain over the whole of the left side of the head; and in the left eye-brow, and at the bottom of the orbit, her anguish was scarcely to be borne. In the succeeding night, the extreme violence of the pain abated, but the swelling of the eye-lids seemed rather to increase; and she thought she felt as if 'the globe of the eye was forcibly driven upwards towards her forehead.' No particular alteration took place in the next seven weeks, at the end of which she was delivered.

" During her labour, which she said was very severe, there was projected between the eye-lids, a bright red tumour, of an oblong form, which for seven or eight days, gradually enlarged, until it occupied, in a vertical direction, almost the whole space between the superciliary ridge and the lower edge of the ala nasi; reaching horizontally from the external angle of the left eye, across the root of the nose, to nearly the internal canthus of the right eye.

---

* *Medico-chirurgical transactions*, Vol. ii. page 1.

" Such was her case, and such her appearance, when I first saw her on the 24th of November. She was then only a week under my care, and ceased to be so from the end of November till the middle of March, a period of three or four months. When she again became my patient, her general health had sensibly declined; and her condition was very wretched. The local affection was also marked by very decided characters. It was distinctly aneurismal. Her pain was constant and acute, and chiefly referred to the bottom of the orbit; but her severest suffering was occasioned by an unceasing noise in her head, which she compared to the 'rippling of water,' and said, 'that it became absolutely insupportable whenever by any accident her head fell below a certain level.'

" The left eye-ball was immoveable; and either enlarged or thrust with so much force against the upper eye-lid, as to cause this part to project in a convex form considerably beyond the superciliary and infra-orbitary ridges. The eye-brow also of the affected side, rose somewhat above the range of that of the opposite side. The external surface of the tumid eye-lid was, for the most part, soft and elastic to the touch, but its cuticle was remarkably coarse, as was, indeed, the texture of the skin generally in the vicinity of the orbit. Deep seated between the integuments of the eye-lid, a little towards the inner canthus of the eye, there was a cluster of small tumours of a firm and dense structure, causing great pain when compressed, and communicating to the finger a pulsatory thrill. Interposed between this cluster and the lower edge of the eye-brow, precisely in the course of the frontal branch of the ophthalmic artery, there was a hard tubercular substance, which rose somewhat higher above the general surface of the eye-lid, and pulsated still more distinctly than the smaller swellings. The lower eye-lid was everted, and formed a bright red convex tumour, following in its outline, the direction of the inferior edge of the orbit, and reaching from the external commissure of the eye-lids, a little way beyond the tendon of the orbicularis muscle. At its upper part, it was covered by an over-lapping of the upper eye-lid, which was paralytic, and entirely concealed the globe of the eye. The most depending point of this tumour reached to within a line of the sub-orbitar foramen. Like the tumours at the upper part of the orbit, this swelling communicated to the touch an aneurismal thrill, which also became evident to the sight whenever the force of the circulation was increased. In addition to these appearances, immediately above the nasal third part of the superciliary ridge, the integuments were gently elevated into a soft ill-defined tumour, occupying very exactly the situation of certain branches of the frontal artery, and pulsating simultaneously with the artery at the wrist. A similar elevation of the skin was perceptible at the root of the nose, giving a faint tremulous motion to a finger placed upon it. When the globe of the eye was uncovered, it appeared, at first, to be enlarged, but a closer inspection shewed it to be forcibly thrust forwards, in a direction somewhat outwards and upwards towards the root of the orbit. A multitude of enlarged vessels might be traced from the surface of the lower tumour to that portion of the conjunctiva which covers the sclerotic coat of the eye. Behind the lens, a fawn-coloured appearance was observed, similar to that which is represented in the second plate of the posthumous work of MR. SAUNDERS. When strong pressure was made upon the common carotid artery, the tremulous motions of the tumour situated at the lower part of the orbit ceased entirely, but the pulsations in the upper swellings continued in some degree. The force of the stroke, was, indeed, much weakened, but no pressure which the patient was able to bear, could entirely suppress it."

On the 7th of April, MR. DALRYMPLE tied the left carotid artery, and, to use his own words, "the effects of the operation were immediate and decisive. As soon as the ligatures were tied, the pulsatory motions of the tumours on the forehead and cheek entirely ceased; but a slight thrilling was still perceptible in the tumid upper eye-lid. The red swelling of the lower eye-lid became paler, and its surface shrivelled. A few minutes after the patient was placed in bed, she was quite free from pain, and the noise by which she had been so long tormented having now also ceased, she declared that "her head no longer felt like her old head."

After "a period of 103 days, the wound was firmly healed, and the patient's recovery secured." MR. DALRYMPLE further remarks "of her present state, it only remains for me to observe, that, after a lapse of nearly two years, her cure appears complete, with the exception of her sight which seems irrecoverably lost."*

*Treatment.*—Of course, if a person was suffering from orbital aneurism by anastomosis, it would be highly important to determine the true nature of the disease as early as possible, for, if it be allowed to increase, the subject of it is not only in constant and imminent danger from hæmorrhage, but the bones of the orbit may become absorbed, and disease of the osseous structures may proceed so far, that, even admitting that the aneurism itself is eventually cured, the patient may perish, or be permanently and seriously injured, in consequence of the ill effects its permitted continuance has produced upon neighbouring parts. Of course the patient should be kept perfectly quiet, the circulation should never be much excited —rest, low diet, tranquillity of mind, and the avoidance of every thing which has a tendency to excite the circulation in any material degree, should be enjoined at every stage of the disease. Pressure has been recommended, but it is more likely to facilitate the absorbtion of the bones of the orbit than to cure the aneurismal enlargement; it was tried without advantage by MR. TRAVERS, in the case already referred to, and in that of MR. DALRYMPLE, it will be remembered that he distinctly states, that when strong pressure was made upon the common carotid artery, although the force of the pulsations was much weakened, yet no pressure the patient was able to bear could entirely suppress it. So that we may at least arrive at the conclusion that pressure, applied in a sufficiently effective manner to produce any *material* and *curative* influence upon the aneurismal swelling, must be an extremely painful and tedious process, seldom productive of any real advantage. Knowing that rest of body, tranquillity of mind, low diet, the application of cold in its various forms, and of pressure, are so *seldom*, and so *little* useful, that they rarely prevent the increase of the aneurismal tumour, we naturally seek for some more decided method of treatment, and, fortunately, the improved state of surgical knowledge has suggested a means of cure, in the employment of a ligature to the carotid artery, in, what otherwise would be, these fatal cases. Undoubtedly, the common carotid artery should be tied, whenever the adoption of the measures already mentioned have failed to prevent the increase of the aneurismal swelling, and that too, before it acquires any considerable magnitude, for the reasons already pointed out; and we have ample encouragement to perform this operation, not only from the success which followed its performance in the cases related by MR. TRAVERS and MR. DALRYMPLE, but also in our knowledge of the nature of the disease, and the effect of similar means in regard to the same morbid affection in other situations. It will be evident that after the operation has been performed, the patient should be kept perfectly quiet, that the diet should be very low, and that the necessary means of keeping the circulation in a calm and tranquil state, should be adopted.

---

* *Medico-chirurgical transactions*, Vol. vi. p. 3.—It may not be unimportant to notice that hæmorrhage took place twice (at an interval of six days) from an opening, near the eye, left after the operation, and about two months after it had been performed. The quantity of blood lost on each occasion was estimated at from ten to twelve ounces. Hæmorrhage also took place in the case related by MR. TRAVERS, in consequence of a miscarriage, and probably contributed, as in the case related by MR. DALRYMPLE, to render the recovery more perfect than it otherwise would have been. The disease it appears arose, or was first noticed, in both instances during pregnancy.

ANEURISM OF THE OPHTHALMIC ARTERY.—I have never met with a case of this description, the nature of which was confirmed by a *post-mortem* examination, but MR. GUTHRIE mentions one in his *Lectures on the operative surgery of the eye.*

CASE.—*Aneurism of the ophthalmic artery of each side.* —" I have seen one case of true aneurism of the ophthalmic artery, of both sides, which terminated fatally. The symptoms were similar to those above mentioned (referring to his epitomized statement of the symptoms which existed in the cases of orbital aneurism by anastomosis, as represented by Messrs. TRAVERS and DALRYMPLE,) but no tumour could be perceived ; the eye was gradually protruded until it seemed to be exterior to the orbit, but vision was scarcely affected. The hissing noise in the head could be distinctly heard, and was attributed to aneurism. On the death of the patient, an aneurism of the ophthalmic artery was discovered on each side, of about the size of a large nut; the *vena ophthalmica cerebralis* was greatly enlarged, and obstructed near where it passes through the *foramen lacerum orbitale superius,* in consequence of a great increase of size the four recti muscles had attained, accompanied by an almost cartilaginous hardness, which had been as much concerned in the protrusion of the eye as the enlargement of the vessels. The disease existing on both sides, prevented an operation on the carotid being attempted, to which, indeed, the patient would not have submitted."*

It will be remarked, that in this case the nature of the disease was not only satisfactorily determined during the patient's life, but that it was only on account of the existence of the disease upon each side, that an operation for its cure was not undertaken, or at least proposed to the patient.

* Page 168.

# CHAPTER XXII.

## AFFECTIONS OF THE LACHRYMAL APPARATUS.

---

PRELIMINARY REMARKS.—Before treating of the diseases of the lachrymal apparatus, I will briefly enumerate the various parts which constitute this important portion of the appendages of the eye. In the first place, there is a small glandular body—the lachrymal gland—situated towards the outer part of the orbit, and contained in a slight depression in the orbitar process of the frontal bone. It is about the size of an almond, of a yellowish colour, and of an oval form; it is somewhat flattened on its superior and its inferior surfaces, the upper of which is slightly convex, whilst the lower is somewhat concave, in accordance with the form of the parts between which it is placed. The vessels by which it is nourished, enter its posterior margin, and its excretory ducts, (which are generally six in number) pass nearly to the tarsal border, towards its temporal side. Its vascular supply is derived from the ophthalmic artery, and its nerve is the first branch given off by the primary division of the fifth pair.

The lachrymal puncta are two minute pin-hole apertures, situated very near to the nasal angle of the eye, upon a small eminence; in the natural state of parts, they are exactly opposed to each other when the lids are closed. A fine membranous duct passes from each punctum towards the inner canthus, and finally opens either into its fellow, or into the external part, or the temporal side, of the lachrymal sac; they more generally unite before they reach the lachrymal sac, into which they open by a common duct; sometimes, however, after their apparent union, they are separated by a delicate membranous septum. The course of the lachrymal canaliculi is not directly inwards from the punctum to the sac, for the superior canal first turns obliquely upwards and outwards, when, forming an acute angle, it pursues a direction obliquely inwards and downwards towards the lachrymal sac. The lower canaliculus, on the contrary, first inclines downwards and outwards, then, making an acute angle, it turns obliquely upwards and inwards, either to join its fellow and form one common duct, or to open separately into the lachrymal sac.

The lachrymal sac is a cavity for the reception of the tears, formed by the union of a fibrous with a mucous membrane; it is lodged in a groove formed by the os unguis, and the nasal process of the superior maxillary bone; above, it is rounded and closed, so as to be somewhat conoidal in figure, and below, it contracts into a small aperture, from which a duct proceeds obliquely backwards, termed ductus nasalis, which terminates by a slit-like aperture within the nose, where it is concealed by the inferior spongy bone. Thus then, the parts of which I shall treat under the head of "lachrymal apparatus," are very various, and somewhat numerous; consisting of—1, the lachrymal gland, which secretes the tears;—2, the excretory ducts of this gland, which convey the tears to the tarsal margin;—3, the lachrymal puncta which receive and absorb the tears from the surface of the eye;—4, the lachrymal canaliculi, which convey the tears into the lachrymal sac;—5, the lachrymal sac which contains the tears until they are urged into the nasal duct; and—6, the nasal duct which transmits the tears into the nasal aperture.

There is, connected with the lachrymal apparatus, a cular muscle, which has been, of late years, [illegible] [illegible] generally described by anatomists. It is said by Professor Trasmondi, to be "situated at the inner part of the orbit, between the posterior margin of the lachrymal bone, and the lachrymal crest. It arises by an aponeurotic line, which adheres to the bone in a vertical direction, beginning at its upper third, and terminating about four lines below. From this it proceeds forward with parallel fibres, passing under the corresponding portion of the lachrymal sac. Having reached the point where the lachrymal ducts unite, it divides into two equal portions, which accurately cover these ducts. In consequence of this disposition, it has a body and two extremities, the former of which is directed from behind forwards, while the latter are slightly arched, to be adapted to the situation of the lachrymal ducts. Its fibres are enveloped through its whole extent by very delicate cellular tissue. Its external surface adheres in the body to the lachrymal bone and part of the sac, and in the extremities to the lachrymal ducts. Its internal surface, which is covered by a thick layer of fat, is at the extremity of the conjunctiva."*

---

* An account of Trasmondi's communication is contained in the twenty-second volume of the *Edinburgh Medical and Surgical Journal*, page 195.—It appears from a paper published by Mr. Mackenzie in the eleventh volume of the *Medical Gazette*, that the muscle described by Horner and Trasmondi, and known by the name of *tensor tarsi*, or *musculus ungui-palpebralis*, was first described by Duverney, and accurately delineated together with its nerves, by Rosenmuller, who also fully explained its real or presumed uses. Mr. Mackenzie thinks it strange that "the appropriations of other men's discoveries by Horner and Trasmondi," should have passed unnoticed, "until Fusari, who was not to be so easily imposed upon" as Bruschet and others, "at once pointed out the spuriousness of the announced discoveries, and transferred the muscle and its nerves to their proper owners—the Duverney's and Rosenmuller," In making this statement, Mr. Mackenzie appears to have overlooked a note from Mr. Shaw, which accompanied Dr. Horner's first communication respecting the muscle he fancied he had discovered. "I think," says Mr. Shaw, "that the muscle described by Professor Horner, is the same which has been

The uses of this minute muscle are represented to be various and important. It is said to apply the lachrymal puncta to the surface of the eye, to urge the tears into the lachrymal sac, and to regulate their transmission from thence into the nose. Various states of this muscle, such as palsy and spasm, are stated to produce some of those troublesome maladies to which the lachrymal organs are liable.*

### SECTION I.—INJURIES OF THE LACHRYMAL GLAND.

The lachrymal gland is liable to injuries of various kinds, and particularly to wounds from the introduction of some foreign body within the orbit; and cases are recorded where it has sustained serious injury from gun-shot wounds. The effects of these accidents vary in accordance with the extent of the injury, the nature of the instrument with which it was inflicted, and the constitutional condition of the subject in whom it takes place. However, it may produce inflammation which may terminate in suppuration, or it may give rise to atrophy, or to chronic enlargement; and it is said, that it may also produce scirrhus and various other morbid changes in the lachrymal gland.†

---

already depicted in ROSENMÜLLER's plates; but the description given here is so different, and so much better, that I have no hesitation in admitting Professor HORNER's claim to the merit of having discovered it, without having derived any assistance from the labours of other anatomists."—*Medical Repository* for July, 1822.

* "The development of lachrymal fistula, may be arrested in the beginning, when it is known that the tears are retained in the sac by palsy only of the lachrymal muscle. It is possible to prevent relapse of fistulous disease, by administering, after the cure, remedies applied to the muscle and nerves, so as to rouse those vital forces which have been too much diminished in the course of the disease." TRASMONDI in *Edinburgh Medical and Surgical Journal*, Vol xxii. page 200.

† An interesting case of enlargement and induration of the lachrymal gland, occasioned by local injury, is reported in the tenth volume of the *Lancet*, page 166.

The most usual result of any severe injury of this part is inflammation, and a knowledge of this fact at once suggests the propriety of watching the effects of all serious injuries inflicted in the neighbourhood of the lachrymal gland, with a view of detecting the occurrence of inflammation, if it should occur, and of adopting, without delay, the necessary means of checking that important malady.

A wound of the conjunctiva just within the tarsal margin may divide one or more of the ducts which convey the tears from the lachrymal gland to the surface of the eye. I have known this accident produce the occlusion of some of these delicate ducts, whilst the remainder of them have subsequently enlarged. After having attentively observed the effects of a division of the conjunctiva in this situation, I am convinced that the severed ducts have neither united nor become occluded, in some instances, but have ever afterwards discharged their contents by a minute opening—a sort of capillary aperture—at the point where they have been divided.

After a wound of the eye-lid at its temporal side or after a tumour has been removed from that situation, there has sometimes remained a small, a very minute aperture, through which a limpid fluid has exuded. The fluid is, in fact, the secretion of the lachrymal gland, which, having passed down one of its ducts, which has been divided by the injury, flows through the divided part, and maintains a sort of fistulous aperture, similar to the minute capillary opening into the sac, sometimes noticed in children as a congenital defect. This trivial affection is often entirely relieved by passing a fine pointed piece of the nitrate of silver into the opening, or snipping it away entirely, and bringing into accurate apposition the edges of the wound.

## SECTION [illegible].—XEROMA.

Sometimes the lachrymal secretion is deficient in quantity, and the surface of the eye is, in consequence, unusually dry. The conjunctival secretion it is true, takes place as usual, and as far as the secretion of that membrane can remedy the inconvenience, it is relieved: but, patients suffering from this defect, will, notwithstanding, complain that the motion of the lids upon the eye-ball occasions some inconvenience, and that the eye frequently feels as though some foreign body were attached to its surface. The transparency of the cornea is not impaired, and when we examine the surface of the eye carefully, it certainly appears moist, but it is never bedewed with tears, and the inconveniences I have just pointed out are always present.

This disease may arise from some morbid condition of the lachrymal gland, such as atrophy, scirrhus, or the existence of a tumour within its substance, or it may take place as a consequence of disorder or disease of the brain, or from some altered state of the lachrymal, or of the trunk or ophthalmic division of the fifth pair of nerves.

The affection is not particularly important in itself, but, inasmuch as it sometimes arises from disease of the brain, and is then a precursory symptom of amaurosis, and also inasmuch as it is sometimes a premonitory symptom of important disease of the structure of the lachrymal gland, it is entitled to our attention.

In determining the method of treatment it may be necessary to adopt, it is of the first consequence to ascertain, if possible, the circumstance upon which it depends, for the treatment will, of course, be guided by the nature of the cause of the malady. When it takes place as a primary symptom of amaurosis, or as a symptom of various morbid states of the lachrymal gland, the treatment of the *xeroma* will, of course, be merged into the management of the more important malady; but when it arises from a deranged state of the general health, prolonged grief, or a depressed condition of the mind, the treatment will be directed to their removal, which will be accomplished by the usual means. In some cases, where the cause of *xeroma* could not be satisfactorily discovered, the application of blisters to the temples, and electricity to the forehead, has been attended with benefit.

### SECTION III.—EPIPHORA.

The term epiphora is applied to that condition of disease where an accumulation of tears takes place in consequence of an increase of the lachrymal secretion. Of course the eye may be, what is familiarly called, *watery*, from a great variety of causes, and principally from those which influence the excretion of the tears; for instance, the lachrymal passages may be obstructed at some part of their course, or the lachrymal puncta may be preternaturally constricted, and the tears may, in consequence, accumulate and run down upon the cheeks; this condition of things is termed *stillicidium lachrymarum;* but it is essentially different from the disease I have designated *epiphora*, where the secretion of the lachrymal gland is so much increased, that the tears cannot be conveyed through the puncta with sufficient speed, but accumulate upon the surface of the eye, and at the lower lid, until they overflow.

The lachrymal gland may be excited to undue action from chronic inflammation affecting its own structure, from various inflammatory affections of the eye, and in strumous inflammation, in particular, such is the excitement of this part, that, on the slightest exposure of the organ to light, the tears stream down the cheeks in great profusion. A foreign body impacted in the cornea or situated beneath the lids, will occasion a great increase of the lachrymal secretion, and it is in this way that the foreign body is frequently detached from the surface with which it was in contact. Disorder of the digestive organs, the presence of worms in the intestines, and teething, are sometimes attended with epiphora, which is removed by restoring the healthy condition of the stomach and bowels, and by lancing the gums, just as the epiphora may be found to proceed from the one or other of these causes. Lastly, there is a watery state of the eye, dependent on an increase of the lachrymal secretion the cause of which frequently cannot be ascertained, and this epiphora may sometimes be diminished or removed, by the use of a little zinc wash, or by the use of the nitrate of silver drops, or by exposing the surface of the eye to the vapour of æther; and with these remedies may be combined the application of blisters to the temples or above the eyebrows. An obstinate case of epiphora under my own care, affecting only one eye—where the secretion of tears was so much increased that they were continually running down the nose very freely, and whenever the subject of this unpleasant affection went into the open air the secretion was so greatly augmented, that, in addition to that part of it which passed into the nose, a considerable quantity streamed down the cheeks—was very distinctly relieved, and eventually cured by the application of three leeches above the eye-brow, every week for about two months, and the subsequent application of a narrow blister at the highest part of the forehead. The epiphora appeared to me, to depend on a state of morbid excitement of the lachrymal gland—a state of excitement which was not inflammation.

## SECTION IV.—INFLAMMATION OF THE LACHRYMAL GLAND.

Inflammation of the lachrymal gland is, by no means, an occurrence of great frequency. It may happen at any period of life, but, as an idiopathic affection, it is most frequent in children of a strumous habit; when it occurs at a later period of life, it is, generally, in consequence of the infliction of some local injury. A question has arisen as to the primary seat of this inflammation—it has been contended that the inflammation of the cellular texture around the gland, is first inflamed, and that the inflammation extends to the cellular membrane connecting together the acini of the gland, it has also been stated that the true glandular texture is affected in the first instance; and I incline to the latter opinion, because, in the many severe cases of inflammation of the orbital cellular membrane I have witnessed, there has not existed any distinct indication of a corresponding affection of the lachrymal gland, which, I apprehend, would have been likely to have occurred if the inflammation in question were a mere extension of inflammatory action from any surrounding parts, however proximate those parts may be.

*Symptoms.*—There is pain of a more or less severe character in the situation of the lachrymal gland, the eyelid is slightly protruded, vision is a little impaired, and although the surface of the eye is at first too plentifully bedewed with tears, it becomes, afterwards, morbidly dry. As the disease advances, the eye-lid is swollen and œdematous, its vessels are enlarged, and the upper palpebra nearly covers the eye-ball, and can scarcely be raised in the slightest degree by the natural efforts of the levator muscle, there is great pain in the orbit and in the head, the eye-ball is pushed downwards and inwards, and is nearly immoveable, and the surface of the eye is somewhat dry. As the disease advances, the local pain becomes more severe, the pain in the head is also much worse, the constitutional disturbance is very considerable, the eye-ball is protruded, and vision is nearly destroyed, and there is often, too, a most distressing sense of scintillations, vivid flashes of light are frequently much complained of, and more especially when, under the influence of spasm, the muscles of the eye-ball powerfully contract. Finally, when these symptoms have existed for a certain period, when the constitutional disturbance has arrived at a most severe height, producing delirium and threatening phrenitis, the pain is suddenly relieved, but the protrusion of the eye, the swelling and enlargement of the eye-lid, and the ptosis, remain; and there is now an evident sense of fluctuation, the lachrymal swelling is soft and elastic, and scarcely at all painful on pressure, not, as formerly, tense and unyielding, and productive of great agony when slightly compressed. The constitutional symptoms are also much relieved, and the patient is rendered comparatively tranquil. I have stated that the surface of the eye is at first watery, and afterwards dry; but this circumstance is differently represented by different authors.

We have traced the disease up to that stage when the inflammatory symptoms have subsided, and suppuration has occurred, and if, at this period, no measures be taken to effect the discharge of the matter, it will point and burst spontaneously, and will be very likely to leave behind, either a severe degree of ectropium, or a small fistulous opening through which the tears will continue to be discharged.

Mr. Todd has described various forms of inflammation of the lachrymal gland,* and, among others, he has particularly noticed the scrofulous and the chronic. I am aware that strumous children are more subject to idiopathic inflammation of the lachrymal gland than adult persons, and I can so far bear testimony to the accuracy of his description, as to state, that, when this takes place, the disease is slower in its progress, and the matter is decidedly curdy—in short, it is exactly such as would be discharged from an ordinary scrofulous abscess. And then, with regard to the chronic inflammation of this part, it is quite true that it does happen, and that it is characterized by the same kind of symptoms as those we have just enumerated as belonging to the acute inflammation of the lachrymal gland, but its progress is slower, and all its symptoms are milder, it rarely proceeds to suppuration, but is very apt to leave the part much enlarged.

*Modes of termination.*—Acute inflammation of the lachrymal gland may terminate in suppuration, that is its more frequent mode of termination, but it may also lead to enlargement of the part, and it is said that it may give rise to scirrhus;† it may induce a wasting or atrophy of the part, and it may, on the contrary, cause it to remain in a state of permanent enlargement. One effect of inflammation of the lachrymal gland is stated to be, that of causing ophthalmia, and especially pustular ophthalmia. Of course, if the surface of the eye is exposed to the irritation produced by the passage of tears of an acrid nature, or tears, the temperature of which is much increased, it will be liable to become inflamed; but I do not recognize, as inflammation of the lachrymal gland, that sympathetic affection by which its secretion becomes increased in scrofulous and various other forms of inflammation of the eye. The sympathetic irritation of the gland is a consequence of the inflamed state of the eye, and of its increased sensibility to light, and is altogether distinct from an attack of inflammation primarily affecting its own texture.

---

* *Dublin Hospital Reports*, Vol. iii. p. 407.—Benedict considers that the lachrymal gland is generally much affected when the other parts of the orbital contents, situated behind and around the eye-ball, are inflamed. He has pointed out the severe character of the disease, and represents, in the following terms, the mischief which is likely to result if, when suppuration occurs, the surgeon neglects to evacuate the pus;—"Apertione omissa apostematis pus ita collectum mechanica ratione maximam denuo excitat inflammationis vehementiam, quæ citius in phrenitidem abiens ægrotum interimit. Sectione cadaveris instituta et lobum cerebri anteriorem cum meninge inflammatum et puris cum in cranii superficie tum in orbita collectionem videbis." *De morbis oculi humani inflammatoriis*, § 157. Lipsiæ, 1811.

† See Monteath's translation of Weller's *Manual*, Vol. i. p. 152.

*Causes.*—Inflammation of the lachrymal gland is generally caused by local injury, either by puncture of its substance by the introduction of a foreign body within the orbit, or by the lodgment of a foreign body in the gland itself, and by blows upon the orbit; as for the many other circumstances which are sometimes mentioned as its causes, I cannot determine, from my own experience, how far they are correct, but it is mentioned that cold, peculiar conditions of health, and inflammatory affections of the eye, sometimes lead to inflammation of the lachrymal gland; and, without denying that such may be the case, I may state, that I have not seen any instance of this disease so arising in the course of my own practice. Indeed, it is reasonable to suppose that this condition of disease of the lachrymal gland is, by no means frequently produced by the existence of an inflammatory affection of the eye, inasmuch as though the various forms of inflammation of that organ are of very frequent occurrence, we rarely witness inflammation of the lachrymal gland. Now, if the latter disease were even an occasional direct consequence of the former, we should certainly expect it to occur with much greater frequency than it is now known to take place.

*Treatment.*—Presuming the inflammation to be acute, whether occurring as an idiopathic disease, or as the result of accidental violence, the treatment should be of a decidedly antiphlogistic character. Leeches, in considerable number, should be applied immediately around the swelled lids, blisters should be placed at the back of the neck, purgative medicine should be freely given, and the diet should be of the mildest and most unstimulating character. I have also found it useful to open one or more of the enlarged veins of the eye-lid, and allow the blood to flow until it ceases spontaneously. We observe that the upper lid is much swollen, that it almost covers the prominent eye-ball, that it is of a dark purple colour, and that its vessels are much enlarged, and very conspicuous. The surgeon should select one of these prominent veins, puncture it, and prolong the incision a little, and afterwards bathe the part with water, used as hot as the patient can conveniently bear; the blood will issue very slowly at first, but by degrees it flows more freely, until a considerable quantity is obtained, and the eye-lid is very materially relieved.

Constitutional symptoms may occur requiring especial attention, for instance, febrile irritation may run high, or there may be furious delirium, and, in such case, it would be desirable to employ, in addition to local treatment, the ordinary means of tranquillizing the disturbed condition of the system. But we may not have an opportunity of seeing the case at this stage, nor until suppuration has occurred, when the inflammatory symptoms and the pain have, in a great measure, subsided, and fluctuation has become evident. It would be then necessary to encourage the suppurative process, and, for this purpose, we may direct that the part be frequently bathed with tepid water, or fomented with poppy fomentation, and also recommend, when these measures were not being employed, the application of a warm bread and milk poultice. As soon as the suppuration has become complete, and the matter has pointed, it would be desirable to puncture the part, and obtain its evacuation, and it is important that this puncture should be made beneath the eye-lid, if possible, to avoid the occurrence of an unpleasant mark or scar, or a certain degree of ectropium, which are so apt to be left behind when the palpebral integument has been wounded. But the lid cannot always be elevated sufficiently to enable us to puncture the suppurated part beneath it, and, in such case, it would be necessary to pass a lancet through the eye-lid, taking care to evacuate, by slight pressure and by making the opening in a proper situation, all the matter the cavity contains, and it will be remembered that this part of the treatment is of the greatest importance, for, upon its judicious management, depends the occurrence, or otherwise, of great subsequent deformity. It is said, that after having discharged the matter, it would be adviseable to inject the part freely with warm water, and repeat this injection every day, in order to keep the cavity well cleansed and cleared from its secretion, but I do not think this measure at all necessary, and I am persuaded that it is neither safe nor judicious practice. If, after having discharged the matter, it is found, on the introduction of a probe, that the bone is uninjured and the cavity completely emptied, we may apply a piece of adhesive plaster over the wound, if external, and attempt its union by the first intention; for, even though the cavity in which the pus was contained should, on its evacuation, continue to secrete, the matter so secreted will, very probably, become absorbed, and will not require the formation of a second opening for its evacuation. However, there are cases in which it may be necessary to maintain a free external opening—the size of the cavity, the activity of its secreting power, and a distinct accumulation of fluid matter, whenever it is permitted to heal, may suggest the necessity of this. In a case of this nature, after having ascertained the size and extent of the cavity, it is stated that the wound may be healed from the bottom very safely and quickly by applying to its surface a weak solution of the nitrate of silver. Should chronic inflammation of the lachrymal gland arise, it may be adviseable to bathe the part with a cooling lotion, to close the eye-lids, and to protect the eye from the influence of vivid light, and to apply leeches around the swollen eye-lids occasionally; and, when the inflammation is removed, it may be necessary, if the part remains enlarged and indurated, to direct a small quantity of the strong mercurial ointment to be rubbed into it every night and morning, until it is either diminished in size, or, until the infriction of the ointment produces cutaneous irritation. And, finally, if the inflammation arise in a strumous subject, say in a child of a decidedly scrofulous constitution, and, particularly, if the inflammation be marked by the ordinary history and symptoms of scrofulous inflammation, we may apply leeches and cooling lotions to the diseased part, and the remedies usually employed for the improvement or alteration of the health, whenever the existence of scrofula is detected and is found to originate, maintain, or aggravate, any local malady.

The following example of acute inflammation of the lachrymal gland will illustrate the course, and progress, and termination, of the disease, although its result is more fortunate than in some other cases I have witnessed, where

it has been somewhat difficult to prevent the continuance of a fistulous aperture, which has discharged, for a long time, a great part of the fluid secreted by the lachrymal gland.

Case.—*Inflammation and suppuration of the lachrymal gland.*—Alexander Holland, ætat. 13, (residing in Hospital Street), a delicate boy, having light hair, and fair complexion, somewhat tending to Albinism, was brought to me under the following circumstances. There is considerable swelling at the upper and outer part of the right orbit, the superior palpebra is very convex, is slightly inflamed, and a good deal pressed forwards. The eye is directed downwards and towards the nose. He complains of severe pain and fulness in the orbit, and tension of the globe. His father informs me that the boy first complained of uneasiness in the eye about a month ago, and that the eye watered at that time. His eyes had been weak for some months, and he had lately received a blow upon the right eye-brow. In about a week afterwards, the eye-lid began to swell, the eye was pressed towards the nose, the lachrymal secretion was much increased, and the patient complained of great pain in the head, and in the site of the swelling, and also of compression of the eye-ball. These symptoms continued to increase, except that the eye, instead of being "full of tears, became almost dry." At the time I saw him, suppuration had commenced, and, as the skin was a little attenuated by the pressure it had sustained, as the patient still complained of severe pain (although it had rapidly diminished during the last few days), and as the eye-ball was nearly concealed by the tumid eye-lid, I thought it adviseable to make a free incision in the part, and for this purpose made a free opening into the palpebra, a little below the eye-brow, in a direction parallel with the tarsal

margin, with the effect of discharging a good deal of blood, and evacuating a little thick curdy pus mixed with some tears.

*Treatment.*—I directed the part to be poulticed; prescribed a little aperient medicine, and a cooling collyrium; told them to keep the patient in a darkened room; and to lower his diet.

*State of the eye on the following day.*—The swelling and pain is much diminished, the eye is not so dry as yesterday. The eye-ball has nearly recovered its natural position. Vision is not at all impaired. The wound continues open, and discharges a good deal of turbid fluid, mixed with curdy, stringy, pus. There is distinctly felt underneath the orbitar margin, a hard and somewhat irregular body, which appears to be notched, or absent at its middle part; at all events, there is a vacancy there, bounded on each side by what appears to be the enlarged and indurated margin of the lachrymal gland.

*Treatment.*—To be continued.

*Subsequent course and final result of the case.*—From this period the inflammation subsided; the enlargement gradually disappeared, and the eye was restored to its natural position. A discharge of curdy and tear-like fluid continued to issue from the opening beneath the eye-brow for some time, but it eventually closed, with no ill effect except that the skin was a little pushed inwards—slightly tucked within the orbit—at the place where it had been divided. The secretion of tears goes on in this eye just as freely as in the other.

it has been somewhat difficult to prevent the continuance of a fistulous aperture, which has discharged, for a long time, a great part of the fluid secreted by the lachrymal gland.

Case.—*Inflammation and suppuration of the lachrymal gland.*—Alexander Holland, ætat. 13, (residing in Hospital Street), a delicate boy, having light hair, and fair complexion, somewhat tending to Albinism, was brought to me under the following circumstances. There is considerable swelling at the upper and outer part of the right orbit, the superior palpebra is very convex, is slightly inflamed, and a good deal pressed forwards. The eye is directed downwards and towards the nose. He complains of severe pain and fulness in the orbit, and tension of the globe. His father informs me that the boy first complained of uneasiness in the eye about a month ago, and that the eye watered at that time. His eyes had been weak for some months, and he had lately received a blow upon the right eye-brow. In about a week afterwards, the eye-lid began to swell, the eye was pressed towards the nose, the lachrymal secretion was much increased, and the patient complained of great pain in the head, and in the site of the swelling, and also of compression of the eye-ball. These symptoms continued to increase, except that the eye, instead of being "full of tears, became almost dry." At the time I saw him, suppuration had commenced, and, as the skin was a little attenuated by the pressure it had sustained, as the patient still complained of severe pain (although it had rapidly diminished during the last few days), and as the eye-ball was nearly concealed by the tumid eye-lid, I thought it adviseable to make a free incision in the part, and for this purpose made a free [illegible] into the palpebra, a little below the [illegible] i[illegible] parallel with the tarsal

margin, with the effect of discharging a good deal of blood, and evacuating a little thick curdy pus mixed with some tears.

*Treatment.*—I directed the part to be poulticed; prescribed a little aperient medicine, and a cooling collyrium; told them to keep the patient in a darkened room; and to lower his diet.

*State of the eye on the following day.*—The swelling and pain is much diminished, the eye is not so dry as yesterday. The eye-ball has nearly recovered its natural position. Vision is not at all impaired. The wound continues open, and discharges a good deal of turbid fluid, mixed with curdy, stringy, pus. There is distinctly felt underneath the orbitar margin, a hard and somewhat irregular body, which appears to be notched, or absent at its middle part; at all events, there is a vacancy there, bounded on each side by what appears to be the enlarged and indurated margin of the lachrymal gland.

*Treatment.*—To be continued.

*Subsequent course and final result of the case.*—From this period the inflammation subsided; the enlargement gradually disappeared, and the eye was restored to its natural position. A discharge of curdy and tear-like fluid continued to issue from the opening beneath the eye-brow for some time, but it eventually closed, with no ill effect except that the skin was a little pushed inwards—slightly tucked within the orbit—at the place where it had been divided. The secretion of tears goes on in this eye just as freely as in the other.

it has been somewhat difficult to prevent the continuance of a fistulous aperture, which has discharged, for a long time, a great part of the fluid secreted by the lachrymal gland.

CASE.—*Inflammation and suppuration of the lachrymal gland.*—Alexander HOLLAND, ætat. 13, (residing in Hospital Street), a delicate boy, having light hair, and fair complexion, somewhat tending to Albinism, was brought to me under the following circumstances. There is considerable swelling at the upper and outer part of the right orbit, the superior palpebra is very convex, is slightly inflamed, and a good deal pressed forwards. The eye is directed downwards and towards the nose. He complains of severe pain and fulness in the orbit, and tension of the globe. His father informs me that the boy first complained of uneasiness in the eye about a month ago, and that the eye watered at that time. His eyes had been weak for some months, and he had lately received a blow upon the right eye-brow. In about a week afterwards, the eye-lid began to swell, the eye was pressed towards the nose, the lachrymal secretion was much increased, and the patient complained of great pain in the head, and in the site of the swelling, and also of compression of the eye-ball. These symptoms continued to increase, except that the eye, instead of being "full of tears, became almost dry." At the time I saw him, suppuration had commenced, and, as the skin was a little attenuated by the pressure it had sustained, as the patient still complained of severe pain (although it had rapidly diminished during the last few days), and as the eye-ball was nearly concealed by the tumid eye-lid, I thought it adviseable to make a free incision in the part, and for this purpose made a free opening into the palpebra, a little below the eye-brow, in a direction parallel with the tarsal

margin, with the effect of discharging a good deal of blood, and evacuating a little thick curdy pus mixed with some tears.

*Treatment.*—I directed the part to be poulticed; prescribed a little aperient medicine, and a cooling collyrium; told them to keep the patient in a darkened room; and to lower his diet.

*State of the eye on the following day.*—The swelling and pain is much diminished, the eye is not so dry as yesterday. The eye-ball has nearly recovered its natural position. Vision is not at all impaired. The wound continues open, and discharges a good deal of turbid fluid, mixed with curdy, stringy, pus. There is distinctly felt underneath the orbitar margin, a hard and somewhat irregular body, which appears to be notched, or absent at its middle part; at all events, there is a vacancy there, bounded on each side by what appears to be the enlarged and indurated margin of the lachrymal gland.

*Treatment.*—To be continued.

*Subsequent course and final result of the case.*—From this period the inflammation subsided; the enlargement gradually disappeared, and the eye was restored to its natural position. A discharge of curdy and tear-like fluid continued to issue from the opening beneath the eye-brow for some time, but it eventually closed, with no ill effect except that the skin was a little pushed inwards—slightly tucked within the orbit—at the place where it had been divided. The secretion of tears goes on in this eye just as freely as in the other.

it has been somewhat difficult to prevent the continuance of a fistulous aperture, which has discharged, for a long time, a great part of the fluid secreted by the lachrymal gland.

Case.—*Inflammation and suppuration of the lachrymal gland.*—Alexander Holland, ætat. 13, (residing in Hospital Street), a delicate boy, having light hair, and fair complexion, somewhat tending to Albinism, was brought to me under the following circumstances. There is considerable swelling at the upper and outer part of the right orbit, the superior palpebra is very convex, is slightly inflamed, and a good deal pressed forwards. The eye is directed downwards and towards the nose. He complains of severe pain and fulness in the orbit, and tension of the globe. His father informs me that the boy first complained of uneasiness in the eye about a month ago, and that the eye watered at that time. His eyes had been weak for some months, and he had lately received a blow upon the right eye-brow. In about a week afterwards, the eye-lid began to swell, the eye was pressed towards the nose, the lachrymal secretion was much increased, and the patient complained of great pain in the head, and in the site of the swelling, and also of compression of the eye-ball. These symptoms continued to increase, except that the eye, instead of being "full of tears, became almost dry." At the time I saw him, suppuration had commenced, and, as the skin was a little attenuated by the pressure it had sustained, as the patient still complained of severe pain (although it had rapidly diminished during the last few days), and as the eye-ball was nearly concealed by the tumid eye-lid, I thought it adviseable to make a free incision in the part, and for this purpose made a free opening into the palpebra, a little below the eye-brow, in a direction parallel with the tarsal

margin, with the effect of discharging a good deal of blood, and evacuating a little thick curdy pus mixed with some tears.

*Treatment.*—I directed the part to be poulticed; prescribed a little aperient medicine, and a cooling collyrium; told them to keep the patient in a darkened room; and to lower his diet.

*State of the eye on the following day.*—The swelling and pain is much diminished, the eye is not so dry as yesterday. The eye-ball has nearly recovered its natural position. Vision is not at all impaired. The wound continues open, and discharges a good deal of turbid fluid, mixed with curdy, stringy, pus. There is distinctly felt underneath the orbitar margin, a hard and somewhat irregular body, which appears to be notched, or absent at its middle part; at all events, there is a vacancy there, bounded on each side by what appears to be the enlarged and indurated margin of the lachrymal gland.

*Treatment.*—To be continued.

*Subsequent course and final result of the case.*—From this period the inflammation subsided; the enlargement gradually disappeared, and the eye was restored to its natural position. A discharge of curdy and tear-like fluid continued to issue from the opening beneath the eye-brow for some time, but it eventually closed, with no ill effect except that the skin was a little pushed inwards—slightly tucked within the orbit—at the place where it had been divided. The secretion of tears goes on in this eye just as freely as in the other.

that cases are related, where the patient has been said to weep after the removal of the lachrymal gland, and that the secretion of tears has gone on just as usual, but it is impossible to admit the accuracy of such a statement. **Magendie** removed the lachrymal gland in rabbits, and we collect from his experiments, that tears were no longer secreted, that, in fact, the lachrymal gland is not reproduced when it has been extirpated. In connexion with this subject I may mention, that **Dr. O'Beirne** removed the lachrymal gland, which had become scirrhus and was enlarged to six times its natural size, and a note appended to the case by **Mr. Todd**, intimates, that "**Dr. O'Beirne** has lately heard that his patient continued perfectly well, and suffered no inconvenience whatsoever from the loss of the gland." But I cannot imagine that the Doctor intended to imply that the tears were secreted as usual, (although this is but a legitimate inference from his statement,) and if they were not so secreted, the patient must, I conceive, have suffered some degree of inconvenience, however slight, from the loss of the gland. **Beer** represents dryness of the eye as one of the symptoms of enlargement (scirrhus ?) of the lachrymal gland, but **Mr. Todd** entertains a different opinion, and in the case previously mentioned, in which **Mr. Lawrence** removed the lachrymal gland, the eye was, prior to the operation, observed to water, "there was a constant profuse watery discharge whenever the eye was exposed to the air." I believe this apparent contradiction may be satisfactorily explained. At an early period of the disease, when the gland is only slightly enlarged, the secretion of tears is increased in consequence of that general irritation of the eye which the affection of the gland is prone to excite, but, when the disease is far advanced, and the gland much enlarged and indurated, the secretion of tears is either much diminished or altogether suspended, and then the sensation of dryness of the eye, to which Beer alludes, is experienced; not that the surface of the globe is actually dry, for the conjunctival secretion will prevent that, but the absence or diminution of the lachrymal secretion will occasion a slight, though distinct, sensation of dryness, which is, I imagine, all that Beer intended to imply. When the disease has continued for some time it is apt to cause the destruction of the eye, and to produce caries, or absorption of the bones of the orbit. The eye is first slightly protruded and pushed inwards, and vision is not materially impaired, but, when the gland acquires a large size, the eye-ball is still further protruded, vision is completely destroyed, the cornea sloughs, the humors are discharged, and nothing remains attached to the optic nerve except the external tunics of the globe; and, at the same time, the bones of the orbit become carious or absorbed, from pressure; and, it is remarked, that the osseous structures become absorbed, whilst the fibrous membrane of the eye remains entire; for, it will be remembered, that the contents of the eye-ball are not discharged owing to the absorption of the sclerotica, but from sloughing of the cornea. The importance of an acquaintance with this fact is sufficiently evident;—if the disease be allowed to remain too long, although we may then extirpate the diseased gland, the bones of the orbit will have become carious, and this effect of the (improperly permitted) long existence of the disease, will often constitute a more serious, a more painful, and more tedious malady, than that we have removed. In fact, the continued enlargement of the lachrymal gland involves the same effects on the bones of the orbit, &c., merely in right of its size, as does the progressive increase of any tumour developed in that cavity.

I have never read or heard of any case in which a scirrhous or cancerous disease of the absorbent glands of the face and neck, or in the neighbourhood of the eye, occurred in consequence of a scirrhous affection of the lachrymal gland; and, as far as experience hitherto extends, we are justified in assuming that this glandular affection does not take place.

The question, as regards the true scirrhous character of the disease of the lachrymal gland, so designated by MR. TODD and other writers, has been previously discussed. It does appear to me that, if it be not true scirrhus, it so nearly resembles it—so much more nearly ressmbles it than any other condition of disease—that, for all practical purposes, it is safe and convenient so to consider and arrange it.

*Treatment.*—At an early stage of the disease, the effect of leeches may be tried, just as in scirrhous induration of other parts, placing them immediately over the enlarged gland, and applying them at least once a week, in a number proportioned to the strength of the patient. Iodine and mercury may then be tried, and if, having given this plan of treatment a fair trial, the disease continues to increase, it would be better to propose, without delay, the extirpation of the diseased part. For the purpose of relieving the severe pain which usually attends this disease, we may advantageously have recourse to the usual means of palliating local uneasiness, such as the use of poppy, and various narcotic fomentations, the free application of belladonna to the skin above the eye-brow, and the internal administration of opium.

CASE I.—*Scirrhous enlargement of the lachrymal gland successfully removed.*—"Jane WORTHINGTON, ætat. 70, admitted into the Richmond Surgical Hospital, on the 26th of August, 1821. The lachrymal gland forms a large irregular tumour, which occupies the upper part of the orbit, and projects more than half an inch beyond the superciliary ridge. It is covered by the superior palpebra, which is stretched upon it, thus rendering the knotty eminences on its surface very conspicuous. The tumour is extremely hard, and moveable to a slight extent in a transverse direction only. Some who have carefully examined it, are of opinion, that it adheres to the roof of the orbit.

"The globe of the eye is not enlarged, but it has been protruded by the tumour, and is so low upon the cheek that the cornea lucida is nearly on a line with the edge of the ala nasi. The inferior eye-lid is everted, and appears dragged down with the globe; its conjunctiva is much thickened, particularly in the line of its fold; there is chemosis and considerable turgescence of the superficial blood-vessels of the eye. The pains are severe and lancinating, and extend from the tumour to the globe, accompanied with a sense of heat, and a frequent discharge of scalding tears."*

It was determined in consultation to remove the tumour, and the operation is thus described by Mr. Todd, who performed it:—

"The patient having been placed on her back, on a table, with her head a little elevated, and secured by my assistants, a transverse incision was made through the integuments, nearly parallel to the superior margin of the orbit, from one extremity of the tumour to the other; and having cut through the orbicularis palpebrarum, and the ligamentum tarsi, I exposed, by a careful dissection, the entire of the anterior surface of the tumour. The diseased gland was then found firmly wedged into the orbit, and it was not without difficulty that the handle of the scalpel was introduced between it and the supercilliary ridge, to dissect the former from the orbitary process of the frontal bone. The surface of the gland next the eye, was irregularly lobulated, and the lobes had insinuated themselves amongst the muscles and other contents of the orbit, so as to render their disentanglement extremely difficult and hazardous; however, by cautiously tearing their cellular attachments with the end of my finger, the handle of the knife, and the blunt extremity of a director, and by cutting on my finger with a probe-pointed bistoury, some firm membranous bands, which could not be easily broken, I succeeded, in the course of a few minutes, in extracting the entire tumour."*

---

* *Dublin Hospital Reports*, Vol. iii. page 419.

*Examination of the diseased structure.*—"The diseased gland was found, on examination, much larger than a walnut; it presented on the surface, which had been turned towards the eye, three considerable eminences, or lobes, with deep fisures between them; it was almost as firm as but more elastic than cartilage. A section of the gland exposed several small cartilaginous cysts, which contained a glairy fluid, and the interspaces consisted of a firm fatty substance traversed by a few membranous bands."†

CASE II.—*Enlarged and indurated (scirrhous?) lachrymal gland successfully extirpated.*—"John CLIFTON, twenty-four years of age, came under my care, on the 14th of March, 1825. Seven years ago, he was struck violently on the left upper lid, by an apple thrown at him; swelling followed, and gradually subsided. Two months afterwards, the lid swelled again, with considerable pain, which, having lasted a month, went off entirely. With the swelling the eye began to water, and there was a constant copious lachrymal discharge, rendered still more abundant by exposure to the air. The swelling of the lid, and the lachrymation continued, and the globe was gradually protruded from the orbit, with the loss of all useful vision. A fortnight before admission, inflammation of the eye took place, with considerable pain. There is now a general fulness of the upper lid, which is more particularly swelled and increased in breadth near the external angle. The eye-ball and lower lid, pushed downward and inwards, reach about half way between the orbit and nose; but though the former is out of its socket, the lids are so extended, as to cover it completely. A hard unyielding tumour, with tuberculated surface, projects a little beyond the margin of the orbit at its upper and outer part. This seems to admit of being moved a little from side to side, upon the bone, but the point is rather doubtful.

---

* *Ibidem*, page 422. † *Ibidem*, page 423.

" The tumour was removed on the 25th of March, the external incisions being ample, as it obviously filled a large portion of the cavity. The longest, of about three inches, extended from the root of the nose, along the fold of the upper lid, to the temple; a second of about two inches, passed perpendicularly over the forehead and upper and outer part of the orbit, to meet the other at right angles; it was necessary to make a third cut from the first incision towards the anterior part of the zygoma. When the flaps made by this crucial incision were turned aside, the seat of the tumour was completely exposed. No other difficulty was experienced except that inseparable from the size and hardness of the swelling, its deep extent backwards, and close contact with the orbit and its contents: the surrounding connexions were, however, merely cellular. The tumour was found to be the lachrymal gland, increased to the size of a large walnut, and of compact homogeneous texture. It had a light yellow colour, with an appearance of radiated fibres at one point; it approached in firmness to cartilage, and altogether bore a near resemblance to the firmest part of a scirrhous mammary gland."*

In the two preceding cases serious hæmorrhage followed the operation. MR. TODD mentions that "in two hours after the operatoin, an alarming hæmorrhage took place: this, from the great depth at which the wounded vessel was situated, and the extensive extravasation of blood into the loose cellular tissue of the orbit, was with difficulty suppressed by MR. BENSON making pressure with his finger. Dossils of lint were then introduced into the wound, and the bleeding did not recur." MR. LAWRENCE states that "a large quantity of blood was lost during the operation; as it filled the deep cavity left by removing the tumour, so that its source could not be readily discovered, the patient was left quiet in bed, with the wound open, in the hope that the bleeding would cease; it went on freely for more than half an hour, rendering the patient very faint; an artery was then tied."

The operation is considered to have been followed, in both these cases, by a completely and permanently successful result.

## SECTION VII.—TUMOURS IN THE LACHRYMAL GLAND.

It is said that various kinds of tumours are formed in the substance of the lachrymal gland, but my own experience does not enable me to state that all those tumours which are developed in cellular membrane and other of the tissues, occur in this situation. However, there is a tumour which occasionally forms (though not very frequently) within this part, containing a clear limpid fluid, surrounded by a cist, and sometimes acquiring considerable size. This disease was originally described by SCHMIDT, and subsequently by BEER, and both those celebrated men appear to have considered the disease to arise from an accumulation of tears in a cavity formed within the lachrymal gland. I must confess that, without denying either that hydatids, or common encisted tumours may form in the substance of the lachrymal gland, may cause the enlargement of that part, and may, in short, give rise to all the symptoms which a lachrymal gland, enlarged from any other cause, may produce, I am strongly disposed to believe the opinion they have expressed, with regard to the general nature of these lachrymal tumours, to be perfectly correct.*

---

* *A Treatise on the Diseases of the Eye*, by W. LAWRENCE, page 698.

*Symptoms.*—The early symptoms of this disease are precisely those of scirrhous enlargement of the part, and require no particular description, except that the lancinating pain is not present, the surface of the eye feels much drier, and the sharp, indurated, uneven, tuberculated margin of the gland cannot be felt beneath the orbitar ridge. With these exceptions the symptoms are precisely the same, for they arise from the mere enlargement of the part and the diminution of its secreting structure, and the accumulation of a great part of the fluid which is secreted. There is slight protrusion of the eye-ball, which is rather pushed towards the inner canthus, impaired and, in some cases, double vision, slight swelling and increased convexity, with hypertrophy, of the upper eye-lid, and so on; but there is one symptom in this case which is not present at the early stages of scirrhous enlargement of the lachrymal gland—that is, a want of the due quantity of tears upon the surface of the eye. As the disease proceeds, fresh symptoms occur, there is considerable pain, but it is not of a lancinating character, it is a sensation as though something were protruding the eye-ball from its socket—as though something placed behind the eye-ball was endeavouring to expand itself by pushing the globe forwards. The eye-lids are more swollen, rendered more convex, and cover all the temporal side of the eye, exactly as is represented in the second plate in MR. TRAVERS' *Synopsis.* There will be a good deal of hemicrania, and constitutional disturbance in some form or other; the patient will probably complain that his sight is nearly destroyed, or of scintillations, or of muscæ volitantes, and, in consequence of the distorted position of the globe, vision will be double; the motions of the eye will be accomplished with great pain, the eye itself will be more or less protruded, and pushed downwards and towards its nasal angle. Finally, the health becomes seriously affected, and, if nothing be done to relieve the patient, delirium may arise and may be succeeded by coma, and the patient may expire after having endured an extreme degree of anguish. But before this fatal termination occurs, other effects will be witnessed in the eye itself. The enlargement of the gland has been traced up to that period when vision was nearly destroyed, and when the eye-ball was slightly protruded, and urged towards its nasal side, and rendered almost immoveable, but, as the enlargement of the diseased gland proceeds, the eye will be actually protruded from its socket, forming exophthalmos or exophthalmia, just as it may happen to be, or otherwise, affected with much inflammation of its own tunics; the cornea will slough, and the contents of the eye-ball will be discharged; but it is said that its membranes do not then collapse, but that the eye continues to project from the orbit, as a fleshy formless mass. I really have seen no such termination as this; but in a case which recently came under my care, the patient did perfectly well, except that a lachrymal fistula remained when I last saw him.*

---

* The gradual formation of the disease is thus described by DR. WELLER:—"A cell of the cellular substance which connects the individual parts of the lachrymal gland, distends into a vesicle, from the effusion of tears into it. At length it separates itself from the rest of the cellular membrane adhering to it, and thus forms an isolated hydatid, lying among the lachrymal acini, which, by a slowly advancing growth, pushes forward the eye-ball from the orbit towards the nose." See MONTEATH's translation of WELLER's *Manual*, Vol. i. page 162.

In reviewing these circumstances, two things occur as matter of interesting inquiry—namely, what effect has the disease when allowed to increase, and continue for a long period? and what is its true nature? In the first place, it may be stated, that when the disease is permitted to increase, after it has acquired considerable magnitude, the bones of the orbit become absorbed and carious, and the patient dies from the effects of such diseased condition of the bones, and particularly from their influence upon the brain. The suppuration and discharge of the contents of the eye-ball, we have previously mentioned, as well as that comatose state of the patient, which is the usual result of the continued and progressive enlargement of the diseased gland. I have represented, at the commencement of my observations, that the disease of the lachrymal gland, termed lachrymal tumour of that part, is generally nothing more at first than an accumulation of tears within its substance which tears become covered with a cist, (formed by the condensation of the cellular membrane which connects together the acini of the gland) and increase with the duration of the malady; and I also pointed out certain exceptions to this, the general rule. If the preceding account of the nature and mode of formation of lachrymal tumour be correct, we should expect to find, on careful examination of the diseased part, that the texture of the gland would be more or less expanded around the fluid, that the fluid itself would be contained in a cist derived from the cellular membrane connecting together the minute portions of the gland, and that it would possess the qualities of tears. In one of the cases mentioned by BEER, the fluid contained in the gland, was termed by him *tears*, and was thin, clear, sharp, and saltish to the taste. In another case related by SCHMIDT, the lachrymal gland was smaller than usual, but in connexion with it, lay a large fluctuating tumour, containing a limpid fluid, and in a third case more than an ounce of extremely clear fluid was discharged, but the precise state of the lachrymal gland was not ascertained. We have, comprised in these statements, several important facts in support of the opinion previously expressed in reference to the pathology of lachrymal tumour, namely, the diminished size and attenuated state of the lachrymal gland, and the *tear-like* qualities of the fluid contained in it—it was limpid, thin, and saltish to the taste. In the following case which lately fell under my own care, there were other circumstances strongly corroborating the probable correctness of this opinion.

---

* The following statement, though proceeding from so distinguished an authority as Professor BEER, appears to be equally confused and inaccurate:—"When the protruded eye, in those cases of lachrymal tumour which are attended with exophthalmos, entirely loses all power of vision, and is deprived even of its natural lustre, the death of the patient is not far distant. Where there is an exophthalmia, the life of the patient is not in such immediate danger, but the eye and the surrounding parts are gradually destroyed, and the bones of the orbit become so much affected, that, after complete destruction of the roof of the orbit, after even the other bones of the cranium, and at last the brain itself have become affected, death slowly puts an end to the patient's sufferings." *Quarterly Journal of Foreign Medicine and Surgery*, Vol. i. page 304.

CASE.—Thomas EVANS, ætat. 29, was suffering from all the symptoms of lachrymal tumour, as previously mentioned (about the cause of which he is totally ignorant), when I first saw him, he has long been the subject of chronic ophthalmia and tinea in its worst form, and the conjunctiva of the upper lid, and particularly at its tarsal margin, is, in a great measure, rendered cutaneous. The eye-lid was excessively swollen, and nearly covered the globe, the eye-ball was protruded and pushed towards its nasal side, his vision was nearly destroyed, and he suffered great pain. On carefully examining the state of parts immediately below the supra-orbitary ridge, after having drawn the eye-lid tightly over the globe, I discovered an elastic fluctuating swelling, but I could not raise it sufficiently to see the swelling, or puncture it beneath the conjunctiva, so I plunged a lancet through the lid, where the fluctuation was most distinct, and discharged a quantity of limpid fluid, amounting to three or four drachms, which was "clear, thin, and saltish to the taste." The symptoms were at once relieved, the eye retired within its orbit, the superior lid admitted of elevation, and the pain entirely ceased; and, what was rather remarkable, the surface of the eye felt dry ever afterwards, the lids were moved upon it stiffly and unpleasantly, but its surface was apparently moist. The aperture I had made continued to discharge, and, at the present time, the man, if living, has, I suppose, a lachrymal fistula, for I cautioned him not to let any one close it, feeling convinced in my own mind that the ducts proceeding from the lachrymal gland had, from some cause or other, become obliterated, and that, if the tears could not be discharged by the opening I had made, they would accumulate and reproduce all the severe symptoms from which he had previously suffered. It is probable that, after a certain period, the gland will become atrophied, from the extension of its structure around the fluid which was evacuated, and that it will cease to secrete, and then a natural cure may be expected to occur.

The lachrymal tumour is, then, formed by an accumulation of tears, which accumulation is, for the most part, caused by obstruction of the excretory ducts of the lachrymal gland,* or by the dilatation of the cellules into which the fluid is deposited before it is transferred to those tubes which directly transmit them to the surface of the eye; the tears distend the part in which they collect; the cellular membrane around them is condensed and forms a cist; into this cist the tears continue to be poured; the substance of the gland is extenuated around them, and, if no means be taken to evacuate them, the part becomes enormously large, and gives rise to all those severe symptoms which are known to occur when the lachrymal gland is the seat of this singular malady. But, when the fluid is discharged, the gland will probably become atrophied, it will waste away, the secretion of tears ceases, but the cist itself may then continue the disease by secreting from its surface, and the case must be treated just in the same way as a small encisted tumour in the orbit, with a fistulous aperture, would be managed.

*Causes.*—Unless the disease arises from obstruction of the excretory ducts of the lachrymal gland, or from passive dilatation of that part which contains the lachrymal fluid until it is conveyed to the surface of the eye by means of its appropriate tubes, I do not know any thing about the cause whence it proceeds. In the case I have detailed, it is probable that the lachrymal ducts became obstructed from chronic inflammation of the conjunctiva, and the subsequent conversion of that membrane into a substance much resembling skin.

---

* Mere obstruction of the excretory ducts of the lachrymal gland will, however, be more likely to give rise to *lachrymal tumour beneath the conjunctiva* than to *lachrymal tumour in the lachrymal gland.*

*Diagnosis.*—This disease may be distinguished from scirrhus of the lachrymal gland, by the absence of the lancinating pain, and of that firm and peculiarly tuberculated margin, which, when scirrhus is present, is felt very distinctly, just beneath the supra-orbitary margin, when the part is examined whilst the eye-lid is drawn tightly over the front of the eye. Instead of this, there will be a firm and even, though elastic and fluctuating, tumour in that situation. Again, it will be distinguished, as far as the distinction is practicable, from a tumour in the orbital cellular membrane, and from an increase in the orbital adipose texture, by the situation of the enlargement, its confinement to a particular part of the orbit, and by its various other characters; by the inward direction of the eye, and by the peculiar dryness of the eye, taken in connexion with the other parts of the history of the case, as comprised in the foregoing description. I am not aware, however, that lachrymal tumour in the lachrymal gland can be distinguised from a common encisted tumour, developed in its texture, for, in both instances, the enlargement will be elastic, and will communicate to the touch a sense of fluctuation, it will occupy the upper and outer part of the orbit, and will be, for the most part, equal and smooth upon its surface, and will cause a sense of dryness of the eye. Perhaps, however, the lachrymal tumour, even before it is visible externally, will cause a sense of dryness of the eye, and will communicate that sensation in an equal degree, at every period of its existence—causing the same measure of dryness of the surface of the eye when the tumour is small as when it is large; whilst the ordinary encisted tumour, which only causes comparative aridity of the surface of the eye as it increases in volume by occasioning the absorption of the glandular texture, and by mechanically compressing its excreting ducts, will be more likely to produce a gradually augmenting dryness of the eye, corresponding to its increase of size.

*Prognosis.*—From the statement of authors it would appear, that the disease is frequently fatal, but I do not see why a fatal result should occur, for there is nothing malignant in its nature; it may be cured either by tapping the part or by destroying the cist containing the fluid, and ought not to be allowed to remain so long as to occasion, by its continuance, those severe effects upon the bones of the orbit which are sure to follow any extensive enlargement of the lachrymal gland. I apprehend that the reason why this disease is considered to be of so dangerous a nature, and why, indeed, it has so frequently proved fatal, is owing to nothing more than the delay of the surgeon in attempting its cure by operation.

*Treatment.*—The treatment may be conveniently divided into the palliative and the radical:—the former consists in the application of those remedies which are calculated to relieve pain, and to tranquillize local as well as constitutional irritation, and also in tapping the part, with a view of obtaining the discharge of the accumulated fluid; and, with regard to the method of doing this, I may mention, that a fine lancet should be carried beneath the lid, if it can be raised sufficiently, and the swelling punctured at its most prominent part. A fine grooved needle, or a sharp lancet may be used. If a lancet be employed, the incision should be made parallel with the supra-orbitary margin. I have termed the puncture of the cist, containing the lachrymal fluid, a palliative means merely, but it may become a radically curative one, and that, too, without the extirpation of the cist itself, by inducing contraction and adhesion of the sides of the cist. And this effect will be more likely to happen when a certain degree of inflammation occurs in the surface of the cist, just as the cavity of various encisted tumours becomes obliterated by the inflammatory process; but I cannot advise the use of stimulating remedies to effect such obliteration, particularly where there is reason to believe that the major part of the excretory ducts of the lachrymal gland are closed, and that a great portion of the gland still remains. If a portion of the gland remains, it is of no use closing the external opening communicating with the cavity of the cist, nor indeed of removing or injecting the cist, for the lachrymal gland will still secrete, fresh accumulation of its secretion will take place, and the same method of treatment must be again pursued to produce its cure. So that, before we attempt to heal the external opening made for the purpose of discharging the contents of the lachrymal tumour, or before we attempt to remove the cist itself, or produce obliteration of its cavity, we must ascertain that the lachrymal gland is completely atrophied.

It appears to me that it would be right to remove the gland as well as the cist in those cases where an operation is undertaken for the radical cure of the disease, for, if we remove the cist alone, presuming we are able to do so, the disease may return, whereas, by slightly extending the operation, it is wholly cured. But it will be imagined that the injury done to the gland in the removal of the cist, will be likely to occasion wasting or suppuration of its structure, and it is true that the section of glandular parts will often cause them to become atrophied; the section of the prostate and of the thyroid glands is well known to produce such an effect; but although this result is probable, it is not certain, nor indeed frequent, as regards the complete atrophy of the part, so that, upon the whole, the plan I have recommended appears to be the most prudent and effectual.

The measures I should advise for adoption would be, first, to attempt the cure of the disease by puncturing the tumour, and this must be done before it has produced any seriously injurious effects upon surrounding parts; and if this does not succeed in removing the disease after a certain interval, we must rest satisfied with establishing a fistulous opening in the palpebral conjunctiva.

If lachrymal tumour existed in a patient, who had a strong objection to undergo an operation for its cure, we might, by directing him to rub the hydriodate of potash, or strong mercurial ointment upon the part, convince him that any operation which might afterwards be required and recommended, was neither proposed nor undertaken, until the most probable and usual means of curing the disease without it, had been fully and fairly tried.

If the tumour in the lachrymal gland be of a different kind from that I have been supposing in the course of my remarks on the treatment of lachrymal tumour, if it be a common encisted, or one of the varieties of steatomatous tumours, the gland should be extirpated, whenever symptoms occur, which are usually considered sufficient to justify the performance of that operation—that is, of course, presuming that the disease continues to increase notwithstanding the use of those milder means of causing its diminution or accomplishing its cure, which are usually employed for these purposes.

## SECTION VIII.—LACHRYMAL TUMOUR BENEATH THE CONJUNCTIVA.

One or more of the excretory ducts of the lachrymal gland may dilate, and, by continued dilatation, may form a considerable swelling beneath the conjunctiva at the upper and outer part of the superior palpebra. The disease is indicated externally by the presence of a tumour beneath the eye-lid, which, when one or two of the excretory ducts of the lachrymal gland are pervious, may be somewhat diminished by pretty firm and prolonged compression, when the eye will become distinctly watery. When the eye-lid is everted, a semitransparent, or vesicular body will be evident—it will seem as though a limpid fluid covered by a delicate membrane were situated beneath the conjunctiva. The disease comes on slowly: at first the tumour is very small, it gradually increases, and, at the same time, the surface of the eye becomes somewhat dry. By its considerable increase the eye may be pushed towards the nose, and its motions may be materially limited. The disease commences by the enlargement of a single excretory duct, but its enlargement is very likely to cause the obliteration of the remainder, and thus produce a troublesome form of *xeroma;* so that, it will be evident, it never ought to be permitted to acquire any great magnitude.

*Treatment.*—It appears to me that as soon as the nature of the disease is detected, it would be adviseable to make an opening into the conjunctival covering of the tumour, and permit its contents to pass through the aperture upon the surface of the eye. In this way, it is true, a fistulous aperture is formed, but this is not attended with any approach to the extent of inconvenience occasioned by the employment of some other modes of cure. If the cure be attempted by passing a seton through the swelling, as advised by BEER, for the purpose of causing the adhesion of the sides of the dilated duct, the inflammation excited by the operation will be liable to extend to neighbouring parts, and to destroy the permeability of the other excretory ducts. And the same effect will be likely to take place if an attempt be made to remove the cist by a surgical operation, as **Mr. Mackenzie** has suggested. There is no doubt but that this disease is sometimes mistaken—that its true nature is not detected—and that it is liable to be confounded with ordinary encisted tumours arising from or beneath the conjunctival aspect of the tarsal cartilage.

### SECTION IX.—MORBID TEARS.

The tears have been observed to have acquired various altered characters in the different morbid affections of the eye. In scrofulous ophthalmia they are often hotter and more irritating than under ordinary circumstances; they inflame, or rather assist in inflaming, to a certain extent, the mucous lining of the nose, the upper lip, and the cheek over which they flow; and, under various disturbed conditions of the general health, the tears have their qualities morbidly modified. The best instance of this kind is witnessed in what is termed lachrymal calculus, in which affection the tears become charged with substances which they deposit upon the surface of the conjunctiva, or within the excreting lachrymal organs, and, although I have never seen a decided case of this description myself, many such are upon record, and their authenticity is quite beyond question; besides, the occurrence is so very credible, so consistent with our notions of general pathology, that there exists no necessity for the expression of a doubt, and I fancy the occurrence would be noticed much more frequently, if the parts upon which the tears usually flow, were not depending in their position, and if the tears themselves were not urged forwards before they lodged, for any material length of time, upon the parts over which they are destined to pass. The most interesting case of lachrymal calculus with which I am acquainted, is that related by WALTHER, in the first volume of GRAËFE and WALTHER's *Journal* (page 163): the disposition to deposit from the tears being so strong that many and large concretions formed in each eye in a short space of time, producing considerable irritation, and this morbid state of the tears was eventually corrected by the administration of the liquor potassæ :—" On analysis, they were found to be composed of carbonate of lime, which formed the greatest part of their weight; traces of phosphate of lime; and coagulable lymph or albumen." A morbid state of the lachrymal secretion rarely takes place except in conjunction with inflammation of the eye, or from deranged conditions of the lachrymal gland. Perverted secretion of this glandular part may, however, result from constitutional causes, and may then only admit of relief through the medium of constitutional treatment.

## SECTION X.—INJURIES OF THE EXCRETING LACHRYMAL APPARATUS.

The lachrymal puncta are liable to become obliterated from local injury, and particularly from the application of lime or some caustic substance to the part where they are situated; and when their complete closure takes place, I am not acquainted with any means of restoring and maintaining their patency. If we make an opening into any part of the canaliculus, between the punctum and sac, it will generally close again, and even if it remain open, it will not perform the absorbent function of the natural punctum. The lachrymal canaliculi are sometimes divided, and, in such cases, the complete section of them generally causes their permanent occlusion at the divided part, and stillicidium lachrymarum is produced. If the eye-lids be cut towards their nasal side, and the lachrymal canaliculi be divided between the sac and puncta, the ducts so severed, will become obliterated, as soon as the union of the wounded parts takes place. Attempts have been made to prevent this occurrence by healing the canal over a very delicate probe or fine bristle introduced along its channel, but the trials I have made of this method of treatment have always failed, and I fancy it is not now much employed. When one punctum only is obliterated, or when one canaliculus only is rendered impermeable, stillicidium lachrymarum is not always produced, provided the inner part of the eye-lid has not undergone much change of position; for, if the lacus lachrymalis be properly formed, as it even then may be, the remaining punctum will take up the lachrymal secretion and will convey it to its appropriate conduit.

Wounds of the lachrymal sac generally heal without leaving behind any material inconvenience, but if a lachrymal fistula should remain, the case must be managed as under ordinary circumstances—there is, at least, no peculiar treatment required. Fracture of the osseous canal, through which the nasal duct passes, and other accidents of that osseous conduit, may produce various serious injuries to the nasal duct, such as, laceration of its substance, or adhesion of its sides, and in this way effectually obstruct the passage for the tears, so that, whenever any obstruction of the duct, attended with stillicidium lachrymarum, takes place immediately after any injury to the bones of the nose, I should advise the occasional introduction of a probe, with a view of preserving the patency of the lachrymal channel and its nasal opening.

## SECTION XI.—CONSTRICTED AND PATULOUS STATE OF THE LACHRYMAL PUNCTA.

**Constricted state of the lachrymal puncta.**—In some cases of epiphora, and inflammation of the conjunctiva and tarsal margins, we observe a very irritable and constricted state of the lachrymal puncta, and particularly in what is termed *ophthalmia angularis.* If we separate the lids, the margin of the puncta appears red and prominent, and the puncta are reduced to an almost undistinguishable speck. We cannot introduce a *probe* at all, and scarcely the point of a common pin. As soon as, by patient manœuvering, and by the previous use of a silver instrument made exactly like a common pin, we are enabled to introduce the lachrymal probe, we find that it is forcibly grasped by the punctum, and that there is a great obstacle to its progressive introduction at that part, whilst it appears to pass very freely throughout the rest of its course. If this constricted state of the lachrymal puncta remain after the accompanying inflammation is removed, if the puncta are still constricted, and the epiphora continues, although the inflammatory state of the eye, and of the tarsal margins no longer exists, then it would be proper to try the effect of gradual dilatation. For this purpose, we introduce just within the puncta, a pointed but not a very sharp instrument (which should be rounded above its point, and gradually increase in thickness, as it recedes from its point) two or three times a week, which should be gently rotated for a few minutes within the aperture, so as very gradually to enlarge it.

**Patulous state of the lachrymal puncta.**—The reverse of the preceding state of the lachrymal puncta may exist, they may be exceedingly open, and their calibre much enlarged, so that on slightly everting the lid, the punctum will gape and will readily admit the bulb of the lachrymal probe. I have seen this morbidly patulous state of the lachrymal puncta repeatedly in old persons, who have suffered from chronic ophthalmia, or from a relaxed and œdematous state of the conjunctiva, and it is always attended with epiphora, so that I suppose the power of the puncta to absorb the tears, is, under such circumstances, materially impaired. It is also an occasional attendant on dropsy of the lachrymal sac, connected with diminished tone of its texture and paralysis of the muscular fibres placed upon its surface. The use of a little zinc lotion, or of a weak solution of alum, or the nitrate of silver, two or three times during the day, with the application of the diluted nitrated ointment to the tarsal margins at bed time, generally lessens the inconvenience produced by the disease, although it rarely effects its perfect and complete cure. I do not know that it is absolutely necessary to give any medicines with a view of treating this disease constitutionally, but circumstances may occur to render the adoption of such measures a matter of expediency; however, the local applications I have just mentioned are always useful, and on them alone I generally rely. I have tried the effect of electricity, for the purpose of promoting the contraction of the lachrymal puncta and increasing their absorbent power, and I am satisfied that in some cases of atonic enlargement—a sort of relaxed or morbidly patulous state —of the lachrymal puncta, I have derived much benefit from its employment.

## SECTION XII.—DILATATION AND STRICTURE OF THE LACHRYMAL CANALICULI.

DILATATION OF THE LACHRYMAL CANALICULI.—Sometimes the lachrymal canaliculi become enlarged from atony or relaxation of their texture; but a defect more frequently noticed, consists in the partial dilatation or pouching of the canaliculus a little way from the punctum, and just at the point where it forms a somewhat acute angle to pass, in a nearly horizontal direction, towards the lachrymal sac.* I have seen this swelling as large as a small pea; it is generally globular and transparent, and exists at the tarsal margin, nearly at the inner canthus. It is difficult to empty it by pressure; but, by persevering efforts, this may be accomplished, the fluid *gradually exuding* from the punctum, not being *forcibly projected* from it. When the fluid is discharged, the dilated canaliculus appears as a small flaccid bag and the conjunctiva has a slightly relaxed appearance in its immediate neighbourhood. This state of the lachrymal canaliculus does not prevent it from conveying the tears to the lachrymal sac, for the nostril of the side, corresponding to the dilated canaliculus, is not dry, though it is usually less moist than the other. Sometimes the swelling of the lachrymal canaliculus is so considerable, that it projects from the tarsal margin, and also separates the conjunctiva from the eye-lid, and from the sclerotica, under which it passes, and forms a large transparent vesicle, which may, generally, be emptied by compression. In other instances it is only seen at the edge of the eye-lid, as a small clear cist of water, which admits of removal by persevering pressure. This clear cist consists of nothing more than a yielding of that part of the excreting lachrymal apparatus, which intervenes between the punctum and the sac. I have seen one case in which dropsy of the lachrymal sac existed with this enlarged state of the canaliculus, and a second, in which inflammation of the sac occurred, which, on being opened, was found to contain a quantity of tears, so that it is evident the canaliculus is still able to convey *some* of the tears to the sac. The plan of treatment, I usually recommend, for the relief of this rare and somewhat trivial defect, consists in the following means:—I direct the patient to empty the little bag frequently, by pressing it with a broad flat finger-ring, to drop into the eye, two or three times, a little zinc, or alum lotion, and to apply to the eye-lid every evening a small quantity of the diluted nitrated ointment, gradually augmenting its strength as the part is enabled to bear it. Should it continue to increase, and should it be evident, on the introduction of the lachrymal probe, that there exists no stricture or obstruction between the punctum and the lachrymal sac, then it would be a lesser evil to cause the obliteration of the canaliculus by snipping away its dilated part, than, by allowing it to remain and enlarge, suffer the patient to encounter the irritation of the eye its continuance, under such circumstances, will involve, combined with the unpleasant personal blemish it necessarily constitutes. Its removal is readily accomplished by means of the curved scissors.

---

* A pretty correct idea of the morbid affection to which I have here alluded, may be formed by a reference to the eighteenth figure, in the sixteenth table, of HEISTER's *Institutiones Chirurgicæ*. He has delineated an enlargement of the lachrymal canaliculus, which existed between the punctum and the sac, but he has not represented it as forming at that point where, at a short distance from the punctum, it forms a somewhat acute angle to pass towards the sac. He speaks of it as a tubercle or an abscess; so that he appears to have been wholly unacquainted with the real nature of the disease. In fact, he does not appear to have been acquainted with the course the canaliculi take from the punctum to the sac.

Stricture of the lachrymal canaliculus.—Sometimes the lachrymal canaliculus is strictured and even obliterated, just at the point where it joins its fellow, or where it opens into the lachrymal sac. The defect is readily ascertained by passing a fine probe from the punctum to the sac. If an obstruction exists at any part intervening between these two points it will be readily detected by this manœuvre. I apprehend this affection exists more frequently than is generally suspected, and constitutes the sole and sufficient cause of many cases of *stillicidium lachrymarum* which are presumed to depend on a constricted state of the puncta, on inflammation of the lining membrane of the excreting lachrymal passages, or on obstruction of the nasal duct.

The frequent introduction of a fine probe through the upper punctum, if the upper canaliculus be the seat of the obstruction, or through the lower punctum, if, on the contrary, the inferior canaliculus be the seat of the stricture, comprise all the material part of the treatment: any inflammation or irritation which may result from the introduction of the probe may be removed, may be managed and relieved, by regulating the periods of its introduction by the capacity of the part to bear it, and by the effect of the preceding use of the probe, by the use of cooling collyria, and soothing fomentations, by the administration of aperients, and the proper regulation of the diet.

When the lachrymal canaliculus becomes closed—absolutely occluded—it is almost always at that part where it joins the lachrymal sac, and is to be relieved and cured by the introduction of a probe as in the preceding case. And there are two modes in which the obstruction may be overcome, the first consists in pretty firmly pressing the end of the probe upon the point of obstruction for a certain period every other day, for the purpose of ultimately effecting its absorption, the other has for its object, the forcible passage of the point of the probe into the lachrymal sac, and the preservation of the opening so formed, by the occasional introduction of the instrument. Of these two modes, I usually adopt the former, because it involves much less risk of inflaming the lachrymal sac. Of course, I have been presuming, in the preceding remarks, that the obstruction of the canaliculus depends on an organic adhesion of its sides, which, from their proximity, readily takes place on the infliction of slight injury, or on the occurrence of prolonged irritation.

## SECTION XIII.—ACUTE INFLAMMATION OF THE EXCRETING LACHRYMAL ORGANS, MORE PARTICULARLY AFFECTING THE LACHRYMAL SAC.

The lachrymal canaliculi and sac, and the nasal duct may inflame, and may give rise to exceedingly severe symptoms, such as intense local pain, great constitutional irritation, and even delirium. We might feel rather surprised at this, if we were merely to take into account the extent of the inflamed surface, but it must be remembered that the inner membrane of the lachrymal passages is extremely vascular, that it is contained, for the most part, in an osseous channel, and that the lachrymal sac is surrounded by a firm fibrous membrane, which does not readily yield to a distending force, and is also pretty firmly embraced on its external surface by muscular fibres. It usually happens that the inflammation is not equally severe throughout every part of the excreting lachrymal apparatus, sometimes, indeed, it is seated solely in the lachrymal sac, and very generally affects that part much more severely than either the canaliculi or the nasal duct, the inflammation of which, indeed, may be a slight extension of, a trivial participation in, the acute inflammatory state of the sac.

*Symptoms.*—There is, at first, slight epiphora, and a small painful tumour at the inner angle of the eye, in the situation of the lachrymal sac; by degrees, the epiphora becomes more considerable, so that the tears flow down the cheeks, the tumour, towards the inner angle of the eye, is much increased in size, the nostril of the affected side feels dry and uncomfortable, the eye-lids are slightly swollen, and the skin, covering the tumour, is somewhat red and inflamed. At length the epiphora is confirmed, the dryness of the nostril is much increased, the lachrymal tumour is considerably enlarged, and is exceedingly hard and painful to the touch, the skin upon its surface is much inflamed, and frequently presents a dark livid appearance, and the eye-lids, particularly towards the inner canthus, are vascular and œdematous. The swelling towards the nose is now very considerable, so that the eye is almost concealed, and the cheek is nearly on a level with the nose. This swelling is exquisitely painful, so that the patient complains dreadfully if it is touched; its central part, or that part of the skin covering the distended sac, assumes a livid hue, and quickly puts on a very decided appearance of impaired vitality. The absorbent glands in front of the ear, or beneath the jaw, will probably enlarge and inflame, and will add greatly to the patient's sufferings, and to the distortion of the features. There is, also, some pain in the head, and great constitutional disturbance is present. At length the tumour, towards the inner angle of the eye, being distended to its utmost, points, either a yellowish point is seen in its centre, or a characteristic yellow appearance is seen beneath the skin, and this appearance is often extended over a pretty large surface; the immediately surrounding skin is so much inflamed that it seems about to slough, all the previous symptoms are aggravated, and the face, on the affected side, appears to be the seat of erysipelatous inflammation. At this stage, the tumour very frequently bursts at the part where it had pointed, or the skin, which had been previously so much inflamed and livid in appearance, sloughs. On the detachment of the slough, it might be imagined that the matter beneath would be discharged, and the symptoms would be then relieved; but this does not always happen, for the skin only may be removed, and the texture of the sac may be entire. If, however, the sac has previously given way, or, if it has so nearly given way that its contents have been retained, in a great measure, by the support derived from the skin covering it, then the fluid part of the tumour will be, to a certain extent, evacuated, and the patient will experience some degree of relief: the matter discharged generally consists of pus and tears. If the case be now left to itself, the external wound heals, a fresh accumulation takes place in the lachrymal sac, another attack of inflammation and a renewal of pain supervenes, the part again bursts, and a second time relief is obtained; and, at length, the aperture remains open, the fluids poured into the sac, and secreted by its inner surface, are discharged by the aperture, which becomes fistulous, and the patient remains in this condition, having, in fact, a lachrymal fistula.

If the case is seen soon after severe symptoms have commenced, when the obstruction of the lachrymal passages is complete, the tumour of the sac hard, painful, and not to be removed by pressure, it may happen that, by the prompt adoption of that active treatment which the character of the symptoms indicates, the inflammation may gradually disappear, the lachrymal canaliculi may absorb the tears as usual, and the sac may be emptied by pressure. In fact, the case may recover by the gradual diminution of all the symptoms, and no morbid effect whatever may be left behind.

Now, the first effect of inflammation of the excreting lachrymal passages, is swelling of the inflamed surface, the lining membrane of the lachrymal sac, of the canaliculi, and of the nasal duct becomes tumefied, the tumefaction of this membrane occludes the passage for the tears, whilst the inflammatory secretions collect within the sac, distend it, and produce those serious effects we have just described. It appears to me that the first step of the inflammation is that in which the natural secretion of the part is suspended, the lining membrane then becomes tumefied, and the consequent tumefaction of the membrane prevents the passage of the collected fluids either upwards or downwards—either through the puncta or the nasal duct. The inflammation generally commences in the nasal duct and the sac, in consequence of which the passage for the tears into the nose becomes obstructed, whilst the absorbent power of the puncta remains, but the inflammation soon extends upwards, the lachrymal canaliculi become involved and are no longer capable of transmitting the lachrymal secretion into the sac, and the puncta themselves, from the swelling which exists around their margin, are incompetent to absorb their proper fluids. So that the exact state of things at this period appears to be as follows:—1, the lining membrane of the excreting lachrymal apparatus is extremely vascular, and so swollen that its tube is virtually occluded;—2, the lachrymal sac is full of tears and pus, and very much distended;—3, lymph may be deposited within the sac in flocculent masses, or it may be arranged in laminæ both on its internal and external surface.

It has been imagined that the sac becomes inflamed from the obstruction occasioned by thick secretions, which have been conveyed into it by the canaliculi, and the chief argument adduced in support of this opinion has been derived from the thick and flocculent character of the matters discharged from the distended sac when it is allowed to burst; but it will be evident that, as the nasal duct is much larger than the lachrymal canaliculi, any matters the puncta are able to absorb, the nasal duct would be quite competent to convey away. Inflammation of the excreting lachrymal organs is not often associated with ophthalmia, but I am satisfied that it has sometimes been occasioned by alteration in the lachrymal secretion.*

---

* The development of polypous and other tumours in the lachrymal sac may occasion inflammation of that part, and may remain undetected for a long time—until, indeed, they acquire a considerable size. The following case of polypous growth in the sac (originally published in GRAËFE and WALTHER'S *Journal*) is quoted in the *Lancet*:—"S. GRESIN, ætat. 32, was affected with chronic coryza, which, after having continued for more than a year, was accompanied with profuse epiphora, to which, shortly afterwards, violent inflammation of the lachrymal duct and sac, with an erysipelatous swelling of the face, succeded. The acute symptoms having gradually subsided, there remained a very tense and painful tumour of the lachrymal sac, which, on pressure, was observed to discharge a great quantity of puriform mucus through the nostril and the lachrymal puncta. From this time the patient was subject to repeated attacks of inflammation of the lachrymal sac; the tumour itself did not increase in size, but became more firm, and did not yield to pressure so completely as before; at the same time the lachrymal canal became partially obliterated, and it was only by very strong pressure that any purulent matter was discharged through it. Professor VON WALTHER on examining the tumour, found it very hard, and on strong pressure distinctly felt a solid body in its centre, which appeared to be moveable, of a globular form, and about the size of a small filbert; the lachrymal ducts seemed almost completely obliterated, for there was hardly any purulent matter discharged through them during the examination. M. VON WALTHER was rather doubtful whether the solid body in the tumour was a lachrymal calculus or a polypous excrescence. An incision was made into it, and a considerable quantity of purulent mucus and tears having escaped, the polypus readily presented itself, attached to the anterior paries of the sac by means of a thin but very firm pedicle, and this being divided the tumour was extracted without any further difficulty. The nasal canal, which was found obliterated, was opened by means of a probe, and the wound simply dressed. The little tumour was perfectly solid, homogeneous, and appeared to consist of albuminous matter, coloured by blood. On the third day after the operation, a tent was placed in the lachrymal sac. In a few months the patient left the hospital perfectly cured." Volume xvi. page 603.

*Consequences of inflammation of the excreting lachrymal organs.*—I have stated that by prompt and judicious management, this affection may terminate by the gradual subsidence of all severe symptoms so as to leave behind no morbid effects whatever. Sometimes the acute passes into the chronic form of inflammation; sometimes it leaves behind a state of its lining membrane by which a muco-purulent matter is secreted for some time afterwards, and the nasal duct is now and then obstructed so as to render it necessary to press the tears out at the puncta; sometimes a state of dropsy of the lachrymal sac is produced; or, it may happen, that the lining membrane may become ulcerated, and that its sides may adhere; or, from the quantity of lymph deposited both within and without the sac and the nasal duct, the whole of these parts may be converted into a firm lymphatic mass, or a solid fibrous band; and I have already stated, that it may leave behind a condition of disease which is termed *fistula lachrymalis.*

Whilst arranging these remarks, a woman applied to me with the following condition of disease, and I describe her case as she sits before me:—there is a large tumour towards the left side of the nose; the skin covering this tumour has a dark, dusky-red appearance, immediately over the distended lachrymal sac and at one or two points, it is nearly black, as though about to slough; the inflammation extends over the side of the face, and the redness becomes gradually fainter as it recedes from the sac. The hardness of the tumour readily distinguishes it from the mere inflamed skin; the slightest touch, even an attempt to touch the part, causes her to manifest the greatest alarm and suffering. The eye is slightly inflamed, and, owing to the tumid state of the lids, can scarcely be opened; the tears pass down the cheek. The glands in front of the ear, and beneath the jaw, are much enlarged. Immediately over the centre of the lachrymal sac, the skin has ulcerated; this took place yesterday, but she says that since the part "fell into a wound" she has not been easier. She is suffering from great pain in the head, from feverishness, and great irritability. She was delirious for some hours during the preceding night. It appears that all these severe symptoms have come on in the course of a week. The throbbing, the pain, the tension of the part, combined with the dark appearance of the skin, rendered it necessary to open the swelling at once very freely, and, assisted by MR. LACON, I made a transverse section of the part quite into the sac, with a small scalpel, with the effect of discharging a quantity of pus, of flocculent lymph and tears. The operation was followed by immediate relief, but the pain it occasioned was so great that the poor woman fainted, and she afterwards told me that its severity surpassed description—that it was far beyond any pain she had ever suffered before. On examining the severed edges of the wound, I found that a quantity of lymph was deposited in layers between the sac and the skin,* and that the sac itself was not attenuated, but much thickened, so that it was not likely to have given way for some time. As these sheets are now passing the press, I am not able to give the sequel of the case, but I have no doubt a quantity of skin will slough, and that the progress of the cure will be very slow. As the incision I had made bled very copiously I did not think it necessary to bleed her, but recommended low diet, and active purgatives, and directed her to apply a poultice to the part, and to bathe it frequently with a decoction of poppies.

---

* The appearance of the cut edges exactly resembled the section of a part where the skin and subcutaneous cellular membrane has been affected with erysipelas, except that it exhibited the distinctive appearances on a small and delicate scale.

*Treatment.*—The treatment of this inflammation must be conducted on the ordinary principles, upon which the management of acute inflammation of other parts is undertaken. In the first place, the inflamed part must be very freely leeched,* and when the constitutional symptoms run high, in a person of a strong plethoric habit, it may be also necessary to bleed from the arm. At the same time, the inflamed part must be bathed with tepid water, or some warm fomentation, the bowels should be well opened, and the diet lowered. If these measures succeed in reducing the inflammation, and the symptoms remit, the pain subsiding, and the swelling becoming materially diminished, the same local applications may be continued, and attempts—gentle attempts—may be made to urge the contents of the sac into the nasal duct, or through the lachrymal puncta. In this way, and by the use of these means, the swelling may gradually subside, and the disease may be eventually cured by the employment of a little zinc lotion, or some slightly stimulating ointment. But it may have proceeded so far before our attendance is requested, that our treatment is not at all likely to be so successful; the suppurating sac may point, and the skin may be so excessively inflamed, that, in order to remove the risk of its sloughing, the surgeon ought to puncture it, and evacuate the contents of the inflamed sac. Having done this, he may direct warm fomentations, or a bread and water poultice, to be constantly applied to the part, until the inflammation has subsided, when, if a fistulous aperture remain,—if the tears pass out of the aperture in the sac, and do not pass down the nasal duct into the nose—it will be necessary to adopt the treatment employed for the cure of fistula lachrymalis. It is generally the custom to inject the sac, after it has been opened, first, with warm water, and afterwards with some mild astringent liquid, but I do not see what useful purpose this is likely to answer. The objects of our treatment are sufficiently evident: we have to remove the inflammation, to empty the sac, and to restore the patency of the lachrymal canals: the first of these objects is accomplished by antiphlogistic remedies; the second, either by a surgical operation, by nature alone, or by pressure upon the sac, so as to urge its contents into the nasal duct, or through the lachrymal puncta; and lastly, we have to restore the patency of the lachrymal passages, presuming they are obstructed, and that, as yet, no fistulous aperture communicating with the sac is formed. Now, the nasal duct may become obstructed merely from the tumefaction its lining membrane undergoes during an attack of inflammation, or, the effects of inflammation may cause its permanent obstruction, by producing union of its opposing surfaces, or solid deposition either within its canal or upon its external surface; and, it may then be necessary, to attempt the restoration of the lachrymal conduit, either by the use of the probe, or by the introduction of a style. But, genenerally speaking, unless the inflammation has been unusally severe, greatly mismanaged, or much neglected in the first instance, the nasal duct is not obstructed from any organic change; its calibre not being blocked up from inflammatory secretions, or by adhesion of its sides, but merely by the tumefied state of its inner membrane, which is removed by the same remedies, which take away the inflammation of the lachrymal sac and canaliculi. It appears to me that great injury has been done by attempts to remove the obstruction too soon—before the inflammatory symptoms have sufficiently subsided. It was formerly the custom to term almost every swelling and wound situated towards the nose, and attended with stillicidium lachrymarum, *fistula lachrymalis*, the cause of which was supposed to depend on an obstruction which must be overcome by the introduction of instruments, as in stricture of the urethra. The practice, founded on these notions, was frequently erroneous, and especially so, in the case of inflammation of the excreting lachrymal apparatus; and, where an attempt was made to cure the stillicidium lachrymarum (which really depended on inflammation of its lining membrane, but which was supposed to depend on some organic obstruction in the nasal duct) by the introduction of a probe, it generally happened that it was followed by an aggravation of the inflammation, and by a very serious augmentation of pain and irritation, added to the intense suffering the patient underwent by the passage of a probe into the narrowed and inflamed tubes.

---

* The leeches should not be placed upon the most prominent and inflamed part of the swelling, but merely at its circumference.

This inflammation may be modified by scrofula, and, in such cases, it generally takes place in children, is productive of much less severe symptoms than is the ordinary form of inflammation of these parts, and the matter contained in the inflamed sac is curdled, like the matter produced by strumous inflammation of other parts. The treatment will, of course, be modified accordingly, and when a cure is once effected, the administration of the ordinary remedies for the removal or improvement of that state of the constitution which permitted the strumous inflammation of the lachrymal conduits, must not be neglected.

It appears to me, that inflammation of the excreting lachrymal apparatus does not often take place as an extension of disease from neighbouring parts, for if this disposition to participate in morbid action were as great in this as in many other situations, as an inflamed state of the external tunic of the eye, and of the nasal membrane is very common in scrofulous children, we should much more frequently witness this serious inflammatory affection of the lachrymal organs (for it is always an important malady) than we now do.

### SECTION XIV.—CHRONIC INFLAMMATION OF THE EXCRETING LACHRYMAL ORGANS, MORE PARTICULARLY AFFECTING THE LACHRYMAL SAC.

This affection is by no means infrequent, and may arise as an idiopathic affection, or, as often happens, as a sequel of acute inflammation of these parts. It is characterized by a swelling in the situation of the lachrymal sac, by epiphora, and, when the lachrymal gland is stimulated to increased secretion by any cause, as by going into a keen air, there is stillicidium lachrymarum. The swelling immediately beneath the inner canthus is not usually very large, very painful, or very resisting; it is rather soft and fluctuating, and its contents may generally be discharged by pressure through the lachrymal puncta. The tears commonly pass into the nose, except when any increased secretion of them takes place. Sometimes the swelling will acquire considerable magnitude, but may always be emptied by judiciously applied pressure, either through the lachrymal puncta or the nasal duct; and the expressed matter generally consists of mucus and tears. Sometimes the skin over the enlarged sac is inflamed, and there may be also present a certain amount of ophthalmia. The nature of the contents of the sac are various, but they consist, for the most part, of mucus and tears, not blended, but existing in a state of separation; and the quantity of fluid secreted by the inflamed part is very considerable, so that patients are compelled to empty the sac many times a day. And then, with regard to the size of the sac, that will vary; it may be only equal to the size of a large pea, or it may acquire the magnitude of a walnut; sometimes it is remarkably hard, and, in other instances, it is soft and yielding; these things admit of explanation by a reference to the precise pathological condition of parts, under these circumstances. If the enlargement of the sac take place in consequence of idiopathic chronic inflammation, the part will not be likely to attain a lage size, and the tumour will be soft and yielding; but if it arise from acute inflammation, of which it may be termed an effect, then it will probably acquire considerable magnitude, and be accompanied by not only great induration as respects the sac itself, but also of the entire tract of the lachrymal conduit. We will just inquire into the actual pathological condition of the lachrymal ducts, when there exists, what may be termed, a chronic blenorrhœa of these parts. The inner membrane is slightly inflamed and tumid, and secretes in large quantity a muciform fluid; the effect of this will be, first, obstruction of the nasal duct, which will occur partly on account of the reduced calibre of the part occasioned by its tumefaction, and secondly, in consequence of the lodgment of the inflammatory secretions; the effect of this alone would be obstruction to the passage for the tears, and this would lead to enlargement of the lachrymal sac. But the lachrymal sac is not enlarged from this cause merely, for, its own secretions are very abundant, and, besides, the inflammatory and viscid secretions of the parts above, (the lachrymal canaliculi) are forced into it; hence, then, we find a ready and complete explanation of the whole series of morbid phenomena connected with chronic blenorrhœa of the excreting lachrymal apparatus, and of the order in which they occur; and, what is highly important, we discover that although the natural channel for the tears is diminished or obstructed, it is not so completely obstructed but that the contents of the sac may be forced, by judiciously applied pressure, either into the nose, or through the lachrymal puncta. Now, during the existence of chronic blenorrhœa of these parts, an attack of acute inflammation may supervene, and then, of course, the symptoms will be aggravated, and the case will be, to a certain extent, complicated; and these attacks will, in some instances, not infrequently recur; and, whatever plan of treatment may have been adopted for the cure of the chronic affection, it must yield to the measures the new inflammation may require. And, it is of importance to remember that scrofulous children are more liable than others to this chronic disease of the excreting lachrymal organs, and that in them, the disease is very mild, and is characterized by a free secretion of curdy matter from the inflamed surface.

*Treatment.*—When there is no inflammation present, requiring general bleeding, or the application of leeches, the patient must be directed to employ slight pressure upon the sac, with a view of keeping it pretty nearly empty, such pressure being always so directed as to discharge its contents through the nasal duct if possible, but, if this cannot be accomplished, the pressure must be directed rather backwards and inwards, so as to force the collected fluids into the nasal duct or through the lachrymal puncta. At the same time, some slightly stimulating and astringent application should be used, and, for this purpose, a fine syringe is generally employed, (ANEL's syringe) which has attached to its extremity an extremely delicate tube, which is easily introduced within the punctum, through which the stimulating lotion is injected, or, I should rather say, is intended to be injected, into the nose, for, in very many instances, it only passes along one lachrymal canaliculus, and is discharged at the punctum of the other. I do not think this process of syringing the parts at all necessary, for, if the patient will drop the liquid he is desired to use, into the inner angle of the eye, and hold the head backwards for a few minutes, it will be absorbed by the punctum, and will render all the service it is capable of conferring, and in a much more simple and agreeable manner. A little zinc, or alum lotion, generally answers the purpose very well, and, in addition to them, the patient may be directed to apply very carefully every night, a small quantity of the diluted nitrated ointment along the tarsal margins, taking especial care that a little of it is smeared on that part of them where the puncta are situated. By these means, by the occasional application of leeches to the inflamed part, by the use of blisters to the back of the neck, by the administration of purging medicine, and a proper regulation of the diet, and, when it takes place in feeble strumous children, by the administration of quinine, we may generally succeed in completely removing the disease. When the discharge is unusually abundant, somewhat resembling the gleety fluid proceeding from the urethra after gonorrhœa, the use of the zinc ointment, and the alum lotion, are the best local remedies we can employ. It was formerly the custom, when the lachrymal sac was distended from chronic inflammation of the lining membrane of the excreting lachrymal apparatus, to probe the parts, but certainly with no very useful effect, or correctly understood object. We have explained the symptoms which are present in this state of disease, and we pointed out, in the course of that explanation, that the lining membrane of the lachrymal passages was inflamed, and that all the phenomena of the disease resulted from the consequent tumefaction of the membrane, or some other effect of the inflammation which was then present, so that the introduction of a probe, under this view of the pathological condition of parts, does not appear to hold out any prospect of advantage. On the contrary, by increasing the irritation, which we have stated to be present, it may do considerable harm, and cannot be productive of any benefit. But, when the inflammation has subsided, and when the canal is either altogether obstructed by deposition on its exterior, or partially obstructed by the existence of other forms of stricture, then the use of a probe presents a certain prospect of benefit.

## SECTION XV.—STRICTURE AND VARIOUS FORMS OF OBSTRUCTION OF THE NASAL DUCT.

Stricture of the parts anterior to the commencement of the nasal duct, is very unusual, with the exception of the constricted state of the lachrymal puncta, to which I have previously referred. Stricture of the nasal duct is generally situated at that part of it where the lachrymal sac terminates, and the duct begins; it may also be placed at about its middle, or at its nasal extremity. These are the usual situations of stricture and obstruction of the nasal duct. Stricture of the nasal duct is generally a consequence of inflammation, and may be so slight as scarcely to offer any impediment to the transmission of the tears, or, it may be so considerable as to obstruct, in a great measure, their passage into the nose. The nature of the mischief is detected by the introduction of a probe, and, if there be no inflammation present, (which, however, is often combined with it) the best mode of curing the stricture consists in passing a fine lachrymal probe through it, once a day, directing the patient to keep the lachrymal sac empty if there is any disposition to enlargement of that part, so that no thickened secretion shall be allowed to collect and render the obstruction to the passage of the tears greater than it necessarily is in consequence of the existence of a stricture. The symptoms with which this affection is attended, are referable to the existence of an obstruction to the free transmission of the tears, and I need not enumerate them, as they have been so recently described when treating of inflammation of the excreting lachrymal organs.

The nasal duct may be more seriously obstructed from many causes, such as thickening of its lining membrane, adhesion of its opposing surfaces, deposition on its exterior, and injury to, and disease of, the spongy bones. It may also become obstructed from polypi in its neighbourhood, or from polypi and fungous growths from its interior, and likewise from calcareous depositions within it.*

When the obstruction of the nasal duct is caused by the existence of polypi, the case is managed by the excision of the morbid growth, which is generally termed polypus nasi, for the exact place of its origin cannot always be determined prior to the patient's death. Polypus arising from the interior of the nasal duct, and from the mucous membrane of the nose, may occasion all the symptoms usually produced by obliteration of the nasal duct.

I have examined a few cases in which the interior of the nasal duct was in a fungous state, but I do not know how this can be detected *with certainty* during life. Such a state of the nasal duct will be attended by epiphora, very probably by dropsy of the lachrymal sac, and by fetid and bloody discharge from the nostril, and the disease so established is generally considered to be an affection of the nasal membrane, and treated by the injection of alum or zinc lotion, or other remedies of a more stimulating nature. I should recommend, in addition to the use of the zinc lotion, that particular attention should be paid to the state of the general health, that no strongly stimulating applications should be used, and above all things, that the habit of snuff taking should be strictly prohibited, and that nothing but slightly astringent, or mildly stimulating lotions should be injected.

---

* A case is related in GRAËFE and WALTHER'S *Journal* in which DR. KRIMER succeeded in curing an obstruction of the nasal duct by accidently withdrawing upon the point of a probe, a small calculus, which produced the obstruction. The calculus was the size of a pea, it was ash-gray, covered with thick mucus, polished, and of a calcareous appearance, and insoluble in water, alcohol, and weak vinegar.—"In more than one instance," says MR. TRAVERS, "I have turned out a considerable quantity of calcareous matter lodged in the lachrymal ducts, like the calculi of the salivary ducts." *Synopsis*, page 243.

Obstruction of the nasal duct may be caused by enlargement of the osseous structures along, or near to which the duct passes, and this generally constitutes an incurable form of lachrymal fistula. If the surgeon is able to elicit the entire circumstances of the case, so as to be fully assured of its real nature, he may then endeavour to establish a passage for the tears, by forming an opening through the mucous membrane of the duct into the nose above the seat of the obstruction, or by puncturing the os unguis, but, as a general rule, such cases may be considered to be, in a great measure, irremediable.*

If the nasal duct be narrowed in its dimensions by lymphatic deposition upon its external, or upon its internal surface, we may attempt to restore its proper calibre by the introduction of the lachrymal probe at proper intervals; if it be entirely obstructed from similar causes, or from adhesion of its sides at its inferior extremity, we may have recourse to the same method of cure, and, if necessary, pass the tube through the mucous membrane of the nose, and form a new aperture for the transit of the tears.*

---

* The impossibility of restoring the natural channel for the tears is thus referred to by MR. TRAVERS;—"I have *often* found the nasal canal completely obliterated by ossific inflammation at its upper orifice in skulls." *A Synopsis of the Diseases of the Eye*, page 248.

### SECTION XVI.—STILLICIDIUM LACHRYMARUM.

A person is said to suffer from stillicidium lachrymarum when, from any cause, the tears, instead of being conveyed into the nose, collect upon the surface of the eye and at the tarsal margin, and flow down the cheek. The disease may be merely occasional, or it may be constant. Stillicidium lachrymarum may be connected with an excessive, a natural, or even a diminished amount of lachrymal secretion; but it is a necessary condition of the disease that the excreting lachrymal apparatus is unable to convey the tears into the nose as fast as they are secreted. Stillicidium lachrymarum is, for the most part, merely a symptom of some other disease, and its treatment will differ in accordance with the nature of its causes, which are various and numerous.

1. A constricted or obliterated state of the punctum, or of its canaliculus may cause stillicidium lachrymarum, or it may be occasioned by a patulous state of the punctum, or by a relaxed or dilated state of the canaliculus.

2. It may be occasioned by various excited states of the lachrymal gland in which the secretion of that part takes place with greater rapidity, and in greater profusion than usual, as occurs, for example, in strumous ophthalmia.

---

* I shall more fully discuss these modes of restoring and maintaining the due size of the nasal duct when treating of fistula lachrymalis.

3. It may proceed from an inflamed state of the lining membrane of the excreting lachrymal apparatus, from calculous concretions in them, from suppuration and dropsy of the lachrymal sac, from stricture or obliteration of the nasal duct, from the development of polypous or other morbid growths in the inner membrane of that duct, or any other part of the canal for the conveyance of the tears from the eye into the nose.[*]

4. Various affections of the tarsal margins—such as tinea and lippitudo, (more especially when the margins of the puncta participate in the inflammation,) entropium, ectropium, &c. by which the triangular groove formed by the junction of the cutaneous edge of the tarsal margins for the purpose of directing the tears towards the inner canthus, is rendered imperfect and interrupted—may cause stillicidium lachrymarum.

5. Enlargement and atrophy of the lachrymal caruncle, and any circumstance which prevents the proper formation of the lacus lachrymalis, may also occasion stillicidium lachrymarum.[†]

From the preceding statement, it will be seen that the management of this malady is but the management of various other diseases from which it proceeds, and which either have been, or remain to be, discussed.

---

[*] The reader will find an elaborate paper by WALTHER "De polypo sacci lachrymalis," in the second volume of the *Scriptores ophthalmologici minores*, page 118.

[†] The *lacus lachrymalis* is a somewhat arbitrary term for the small space at the inner canthus of the eye, bounded on its inner *(nasal)* side, by the lachrymal caruncle, on its outer *(temporal)* side, by the lachrymal puncta, and on its superior *(frontal)* and inferior *(facial)* aspects, by the intervening portion of the tarsal margin.

## SECTION XVII.—DROPSY OF THE LACHRYMAL SAC.[*]

When the lachrymal sac is enlarged without inflammation, the tears collecting there mixed with shreds or particles of mucus, and the tumour not giving rise to any pain or uneasiness when compressed, it is said to be the seat of dropsy. Dropsy of the lachrymal sac is then nothing more than enlargement of the part, from distention and relaxation unattended by pain and inflammation. When we press upon the enlarged sac, we may discharge its contents, and then the integument immediately over it, appears flaccid and puckered: it does not resume its usual tenseness, but falls into folds, in consequence of the loss or impairment of its natural elasticity from long continued distention. Such, then, is the pathological condition of the lachrymal sac, when the seat of dropsy, and an acquaintance with it pretty decisively indicates the nature of the treatment it may be necessary to employ for its cure. As its elasticity has been diminished by continued distention, it ought not, of course, to be allowed to become further distended, and its relaxed condition, unassociated with inflammation, points out the propriety of injecting some slightly stimulating and astringent solution. I believe these are the principles of treatment to be kept in view. The patient may be directed to press upon the part whenever the tears collect in it, so as to keep it as nearly empty as possible, and to place a few drops of a weak solution of the sulphate of zinc at the inner angle of the eye, and allow them to become absorbed by the puncta. Various instruments have been invented for the purpose of maintaining constant pressure upon the sac, so as to keep it more completely and uniformly empty than can be accomplished by occasional compression with the finger,[*] but the inconvenience they occasion, the cutaneous irritation they sometimes produce, and, above all, the risk (necessarily connected with their use) of producing adhesion of the sides, and obliteration of the cavity of the lachrymal sac, constitute important objections to their general introduction into practice. I never recommend them to be used for the reasons just stated. When the lachrymal sac is much enlarged, and when the treatment previously mentioned fails to effect a cure, and particularly when the integument is much relaxed and wrinkled, I have, in several instances, derived advantage from removing a portion of skin immediately over the lachrymal sac, and uniting the divided edges of the wound by the first intention—not allowing it to heal by the process of granulation. The comparatively tense state of the integument (which this surgical proceeding is so well calculated to produce) covering the lachrymal sac, which exists on the healing of the wound, is the best mode of producing a constant effective pressure upon the enlarged sac, and materially assists the other curative measures; but it appears to me that before having recourse to this measure, the inutility of the other means should be fully ascertained.

---

[*] HEISTER (*Institutiones Chirurgicæ.* Tab. xvi, Fig. 19,) DEMOURS (*Traité des Maladies des yeux*, Pl. xix. Fig 3, et Pl. xx. Fig. 1,) AMMON (*Chirurgische Kupfertafeln.* Pl. ccviii,) and others, have attempted to delineate the characters of the disease, but they have done little more than represent its size, its situation, its figure, and the absence of ulceration and inflammation of the skin covering the dropsical sac.

---

[*] See representations of instruments for this purpose, in the works of SCULTETUS (*Armamentarium chirurgicum*, Tab. viii. Fig. 1,) HEISTER (*Institutiones chirurgicæ*, Tab. xvi. Fig. 20,) SHARP (*A treatise on the operations of surgery*, Plate 11, Fig. E,) and B. BELL (*A system of surgery*, Plate xix. Fig. 1,) and also in the works of PLATNER, PETIT, and DIONIS.

## SECTION XVIII.—SUPPURATION OF THE LACHRYMAL SAC.

We have already seen that suppuration of the lachrymal sac is a frequent consequence of acute inflammation of that part, that it is attended by very severe pain, and sometimes gives rise to great constitutional disturbance. I pointed out the means of reducing the inflammation of the lachrymal sac, when the case was seen at a sufficiently early period; so as to prevent, if possible, the occurrence of suppuration; and I also stated, that if suppuration did occur, whether the matter distinctly pointed or not, the skin being at the same time much inflamed, it would be far better to open it, in order to avoid the risk of that extensive sloughing of the skin which will sometimes occur when the inflammation is severe and long continued, and the lachrymal sac has become, in consequence, particularly large. I have seen an extensive and troublesome ulceration and great disfigurement produced by the loss of a large portion of skin over the lachrymal sac, which had inflamed and sloughed, because the abscess beneath it had not been opened when the sac was very large, and its cutaneous covering distended and inflamed. After the opening of the lachrymal sac, or after it has burst spontaneously, an aperture remains, through which the tears are discharged for a longer or shorter period, and which may, eventually, be converted into a fistula lachrymalis. In cases of this description, it does not appear to me to be correct practice to attempt to open the nasal duct by the introduction of probes through the canaliculi, even if the tears pass out at the opening formed by the lancet, for some weeks after it has been made. The obstruction to the passage of the tears, is occasioned by the tumefaction of the lining membrane of the lachrymal passages, which, for the most part, gradually and spontaneously disappears after the evacuation of the accumulated contents of the sac; but should it not do so when all the inflammation has subsided, proper measures may, with propriety, be adopted, for the purpose of restoring the natural channel for the tears by artificial means;—at all events, such means may then be employed with a greater chance of conferring benefit, than when a certain degree of inflammation is present.

### SECTION XIX.—FISTULA OF THE LACHRYMAL SAC.

In this disease there is an external opening near to, and generally a little below, the inner canthus of the eye, which communicates with the lachrymal sac, and through which the tears flow, instead of taking their natural and accustomed route.* It was formerly the custom to call almost every affection of the lachrymal organs a fistula lachrymalis, particularly when attended by an enlargement of the sac, but, independently of the obvious error of terms this absurd designation involved, it also led to the most improper and injudicious practice.

Now, fistula lachrymalis may be attended by various symptoms, and may be differently combined, as respects, particularly, the size and condition of the external opening; and these distinctions were formerly considered of sufficient importance to entitle them to separate names, and, on looking over old books, it will be observed that they are accordingly variously designated. They refer to certain differences of this description, under the name of *perfect*, *imperfect*, *simple*, *compound*, *mild*, *obstinate*, *intermittent*, *periodical*, *continued*, *true*, *false*, and so on.

---

* In this definition it will appear, that I so far regard the meaning generally attached to the term *fistula lachrymalis*, as to include, under that designation, an opening into the lachrymal sac, connected with, or directly or indirectly leading to, various apertures in the skin, many of which are certainly not fistulous, according to the strict acceptation —the rigid surgical import—of the word.

1.—Fistula of the lachrymal sac may be combined with a good deal of inflammation, the sac itself may be inflamed, and the skin around the external opening may either participate in the inflammation, or become irritated by the discharge which flows over it.

2.—The aperture may be very small, a mere pin-hole aperture, scarcely observable unless very closely examined, or unless the finger is pressed upon the parts below so as to obstruct the passage of the tears into the nose, or unless from any cause the secretion of tears is unusually abundant.

3.—The external opening may be very large, and may have been produced by sloughing of the skin over the part where the lachrymal abcess pointed, which might have been prevented, if a small puncture had been made in due time, and the contents of the sac discharged.

4.—The osseous structures may have become carious; but this is not a common combination of fistula lachrymalis, unless the disease has been very long continued, or much neglected.*

---

* JANIN says that "it is so rare to find the os unguis in a state of caries,. that, without external causes, I doubt if it can become so;" and MR. SHARP remarks upon the same subject, " from what has been said of the nature of fistula lachrymalis, the use of fire must be discarded in all the stages of it, and even perforation for the most part be practised only when the subjacent bone is carious; but this circumstance is very rare, and, for my own part, since I have doubted its frequency, it has not been my fortune to meet with a single instance of it, though I have had fistulas of many years standing under my care, in some of which the pus has found issue through the bag and skin, and formed an external ulcer likewise."—It will be borne in mind that caries of the os unguis after the cure of lachrymal fistula, is a very rare occurrence, which would not be the case if the disposition of fistula lachrymalis to affect the osseous structures were as great as the older writers supposed.

We have seen that there is an external aperture, that the tears pass through it, and that none, or only a small part of them. pass through the nasal duct into the nose, and hence we deduce the conclusion that there must be either a contraction or obliteration of the part below the lachrymal sac. In tracing the progress of inflammation of the excreting lachrymal organs, we endeavoured to point out the mode in which that affection produced various changes in the inner membrane of those parts, which left behind a strong tendency to lachrymal fistula. We mentioned that the tumefaction of the inner surface of the nasal duct, during the existence of the acute symptoms, virtually occluded its tube, and that the inflammation itself sometimes caused stricture of that channel, or organic adhesion between its sides. We also stated, that the interior of the sac had sometimes experienced that diseased alteration by which, on the evacuation of its contents, a fresh accumulation would take place, a renewal of inflammation would occur, and a necessity for maintaining an external opening communicating with the sac, so long as such disposition remained. Hence, then, it will be perceived that the causes of lachrymal fistula are exceedingly numerous and diversified, and that it is oftentimes essential to the production of a complete and perfect cure that a morbid state of the lining membrane of these parts shall be corrected, as well as all obstruction to the free transit of the tears removed, 'ere it would be adviseable to attempt to heal the external opening which is essential to the fistulous character of the disease. I shall now refer to some of the causes of fistula lachrymalis more particularly, because it is especially important to be well acquainted with them, and to bear them very acurately in mind, in estimating the value of various proceedings which have been suggested for the cure of the disease.

We are assured that the *usual* cause of fistula lachrymalis is an obstruction of some kind or other of the nasal duct,* and it is important, in reference to treatment, to endeavour to make out not merely the precise point of the nasal duct which is strictured or closed, but the nature and extent of such obstruction. Of course, the situation of the obstruction will readily be detected by the introduction of an ordinary lachrymal probe, and the introduction of that instrument will, at the same time, apprise us whether or not the part be merely strictured or actually closed; but it is not, by any means equally easy to determine the extent and nature of the obstruction. If an organic adhesion subsist merely at the nasal extremity of the duct, it may often be in our power to pass through it a large lachrymal probe, but when the nasal duct is obliterated—is converted into a solid fibrous cord—it will be in vain to attempt to pass a probe-pointed instrument through it at once, without the employment of an unwarrantable measure of force. So that the degree of resistance opposed to the introduction of the probe, and the ability, or otherwise, to overcome the obstacle by its use, may be taken as a tolerably fair test of the *extent* of the obstruction. The obstruction itself, when very considerable, consists in the organic union of the opposing surfaces of the nasal duct, or of their union through the medium of a quantity of lymph which has become organized, and which connects, and, as it were, forms into one mass, the whole tube and structure of the ductus nasalis.

---

* “Les larmes ne coulent point dans le nez; elles sont retenues dans le sac lacrymal; elles y causent tension, inflammation, rupture et fistule. La cause de tous ces effets est l’obstruction du siphon lacrymal.” Petit. *Traité des maladies chirurgicales.* Tome i. page 340.—“Les causes de fistule lachrymal sont en grande nombre; mais le plus ordinaires sont l’obstruction du conduit nazal qui empêche l’écoulement de la liqueur lacrymale dans le nez.” “Mémoires sur la fistule lacrymale,” par M. De la Forest, en *Mém: de l’Académie, &c*, Tome. ii. page 176.—“Des observations faites avec plus de soin ont fait voir qu’elle (fistule lacrymale) étoit toujours précédée de l’obstruction du conduit nazal.” Louis en *Mémoires*, &c. page 200.—“On sait qu’au rétrécissement ou à l’oblitération du canal nasal, produits par une cause quelconque, est dûe, dans presque tous les cas, la maladie (fistule lacrymale) qui nous occupe.” *Œuvres chirurgicales*, de P. J. Desault, Tome ii. p. 120.—Contraction or obliteration of the nasal duct is stated by Sabatier (*De la médicine operatoire*, Tome ii. p. 2.) to be almost always (presque toujours) the cause of fistula lachrymalis; and Demours (*Traité des maladies des yeux*, T. i. p. 148.) represents these conditions of the nasal duct to be the sole cause of the fistulous opening in the sac.

*Treatment.**—Before I commence the treatment of fistula of the lachrymal sac, I will briefly refer to a few mèthods of managing the disease, which were formerly considered to be of great value, and some of which, indeed, with slight modifications, are still adapted to many of the complicated forms of this troublesome disease. That its difficulties were long since appreciated, its nature laboriously investigated, and the resources of art laid under extensive contribution for the means of relieving it, may be inferred (if more positive evidence were wanting) from the fact, that HEISTER† gives a very elaborate account of its cure by—1, simple antiphlogistic means ;—2, by compression;—3, by the use of caustic;—4, by the application of the actual cautery;—5, by the perforation of the os lachrymale;—6, by the use of ANEL's syringe and probe, and by the introduction of a hollow tube (somewhat resembling in form the style of the present day, but without the head) over which it was intended to cause the skin to heal. Before this period the operative proceedings were, indeed of a very injurious, inefficacious, or inappropriate character, and, I am perfectly astonished, on examining some old works on surgery, to find that any patients did well after having submitted to the coarse plan of treatment which was very generally employed.*

---

* The reader may obtain a full account of the different modes of treating lachrymal fistula, which have been adopted from a very early period to the present time, by referring to various "mémoires" [one by BORDENAVE, (page 161) another by De la FOREST, (page 175) and a third by LOUIS, (page 193)] in the second volume of *Mémoires de l'academie royale de chirurgie*, and also to the following works:—HEISTER. *Institutiones chirurgicæ*, p. 11, sect. ii. cap. liv. Amsterdam, 1739.—*Traité des maladies chirurgicales.* Ouvrage posthume de J. L. PETIT, Tome i. p. 327. Paris, 1790.—*Œuvres chirurgicales*, de P. J. DESAULT, Tome ii. p. 119. Paris, 1801.—*De la médecine opératoire ;* par M. SABATIER, Tome ii. p, 1. Paris, 1810.—*Dictionaire ophthalmologique*, par M. D. WENZEL, Tome i. p. 285. Paris, 1808. —*Dictionaire des sciences médicales*, Tome xv. p. 579. Paris, 1816.—An elaborate article (" De fistula sacci lachrymalis") by WALTHER, and another (" De fili serici usu in quibusdam viarum lachrymarum morbis") by MARTINI, in the second volume of the *Scriptores ophthalmologici minores.* Lipsiæ, 1828.—The article " Lachrymal organs" in the last edition of COOPER's *Surgical dictionary*.

† *Institutiones chirurgicæ*, p. 2. sect. ii. cap. liv.

For some time after the period at which HEISTER published his large work on surgery, the pathology and treatment of fistula of the lachrymal sac continued to occupy the attention of many distinguished surgeons, and I introduce the following quotation, for the purpose of showing that the surgical management of such cases was brought almost to its present state of perfection nearly a century ago:†—" L'obstruction du canal est quelquefois si considérable, que les injections et la sonde ne suffisent

---

[*] I illustrate the statement in the text by quoting the following case:—" A girl, of about twelve years of age, having a fistula lachrymalis of some years continuance, discharging a mixed crude matter daily into the eye; I laid it open by incision, dilated and digested it, and endeavoured by internals to dispose the body to a better habit, and prosecuted the cure by exsiccants. But it not yielding thereto, I separated the periosteum from the bone, made exfoliation of it, and incarned upon that, supposing I had, by compression, cicatrized the ulcer. But it brake out again upon the leaving off the bandage; upon which I dilated it again, and by actual cautery consumed the callus and bone: after which it cured more easily." WISEMAN's *Surgery*, page 325. London, 1676.

[†] The errors of practice *then* as *now* appear to have been,—1, that the cause of the obstruction in the nasal duct, and the condition of the lining membrane of the lachrymal sac were not sufficiently attended to;—2, that the obstruction was considered to be remediable only and almost altogether by mechanical dilatation, so that the use of instruments was often commenced too early and continued too long, and without the very necessary occasional interruptions.

pas pour y remédier. Il faut alors en venir à une opération fort délicate. Un aide appuie le pouce sur la commissure des paupieres du côté du petit angle, et les tire pour tendre la peau, ce qui fait une petite sallie au tendon du muscle orbiculaire. Le chirurgien porte la pointe d'un petit bistouri demi-courbe au-dessous de ce tendon au rebord de l'orbite, et à trois lignes de la commissure des paupieres, il la plonge doucement dans le sac lacrimal, sans toucher à l'os; et fait une incision qui se termine vers le tendon du muscle du petit oblique. S'il s'est fait une petite ouverture extérieure, il la traverse en faisant l'incision. Il glisse ensuite sur le dos du bistouri une sonde qu'il introduit dans le canal, afin de le deboucher. Il retire la sonde et lui substitue une bougie fine ou un petit séton composés de deux ou trois brins de fil qu'il fait sortir par le nez. Il peut aussi ne se servir que d'une petite bougie de cire, ou une petite tente de plomb qu'on porte seulement un peu au-delà du trou du canal nasal."[*]

I shall now proceed to arrange the treatment of fistula of the lachrymal sac, so as to comprise the management of the various morbid conditions with which the external opening, communicating with the sac, may be combined.

1. *Fistula of the lachrymal sac associated with the development of a polypous growth either in the sac or the nasal duct, or connected with inflammation of the lining membrane of the excreting lachrymal passages.*—If a small polypus arise from the lining membrane of the excreting lachrymal passages, it will, in its progress, be

---

[*] De la FAYE's edition of *Cours d'operations de chirurgie*, par M. DIONIS. Sixième demonstration. Paris 1750.—The treatment of fistula lachrymalis, subsequently recommended by POTT, (*Observations on that disorder of the corner of the eye, commonly called fistula lachrymalis.* London, 1772,) by SHARP, (*A treatise on the operations of surgery.* London, 1769,) by WARNER, (*A description of the human eye, with their principal diseases.* London, 1773,) and other distinguished British surgeons, is far less complete and correct than that of De la FAYE.

rendered evident by various circumstances. If, for instance, it arise within the lachrymal sac, after having produced a tumour at the side of the nose, and inflamed the sac, it will be exposed as soon as the surgeon enlarges the opening which is formed, (if he is injudicious enough to wait until this occurrence takes place spontaneously,) and, of course, it should be removed, and the parts to which it was attached put into as healthy a state as possible, before an attempt is made to close the external aperture. When the nasal duct is obstructed at any part of its course by a small polypous growth, the probe which is introduced for the purpose of ascertaining its situation, will generally enable us to discover its nature also. The obstruction is found to yield readily, and the part bleeds freely after the instrument is withdrawn. In the few cases in which I have suspected disease of this nature, I have had recourse to the occasional introduction of a common lachrymal probe, for the purpose of breaking down and impairing the vitality of the structure of the morbid growth, and I have also directed the patient to use, two or three times during the day, a little zinc lotion (three grains to the ounce of water), instructing him to hold the head back whilst applying the lotion, so that it may be properly absorbed by the puncta and conveyed to the diseased part.

It is in vain to attempt to close the external opening so long as the inflammation of the lining membrane of the parts, which originally caused the mischief, is suffered to continue. The proper method of managing those cases of fistula of the lachrymal sac, connected with inflammation of its lining membrane, is to bathe the part with goulard water, to apply a mild bread poultice to it every evening, to avoid the introduction of probes, and the use of all stimulating lotions. A few leeches along the course of the nasal duct, and around the external ulcer, may also be applied with advantage at short intervals. I am now referring to those cases of lachrymal fistula which are caused, in a great measure, by the obstruction to the passage of the tears into the nose by the tumefaction of the lining membrane of the nasal duct more especially, which tumefaction is owing to inflammation which is actually present.

2.—*Fistula of the lachrymal sac produced by stricture of the nasal duct at some part of its course.*—The calibre of the nasal canal may be diminished, and this effect is generally caused by thickening of its inner membrane, or by deposition on its exterior. If the fistulous aperture be small, be unattended by any inflammation of the surrounding skin, and if there be no inflammation of the interior of the lachrymal conduits, and if the fluid discharged through the opening were merely healthy tears, it would be adviseable to introduce a probe through the upper punctum as far as it can be passed without the employment of much force, and if it is found that the nasal duct is merely slightly contracted, we repeat the introduction of the probe at intervals of two or three days, provided its previous introduction has not excited any amount of inflammation which forbids the continuance of this practice; and, at the same time, we may touch the fistulous aperture every other day with a piece of the nitrate of silver worked to an extremely fine point. This is the simplest form of fistula lachrymalis, and is easily cured. It consists of nothing more than a small external aperture with slight contraction of the nasal duct.

But the nasal duct may be much more contracted, adhesive lymph may be deposited on its exterior, and its interior may be much swollen as a sequel of inflammation, so that not only the nasal duct, but nearly the whole tract of the lachrymal conduits may be much indurated, and the sac, and parts around it may, when pressed with the finger, yield a sensation such as would be experienced when pressing upon a hard unyielding substance. The treatment of such a case would be differently conducted; in the first place, all inflammation (if any existed) should be previously removed by proper antiphlogistic remedies, and then an attempt should be made by the occasional introduction of a probe to effect the gradual enlargement of the nasal duct.

It was to cases such as these that the treatment formerly recommended by ANEL* was said to be very precisely adapted. By the occasional introduction of a small probe through the punctum into the nose, and by the injection of the lachrymal passages, (which he performed through the medium of a neat syringe, which still bears his name, the delicate point of which was introduced into the punctum) he considered himself able to cure almost any degree of obstruction to which the lachrymal canals are liable; but, it will be evident, that when the obstruction is so slight as to be overcome by the trivial force with which a liquid may be injected into the lachrymal canaliculi, it will scarcely be adequate to produce inflammation of the sac, and the consequent formation of a fistulous aperture. In fact, it was stated by MEJAN,† DIONIS,‡ POTT,§ and many succeeding writers, to be inadequate to effect the object in view. But, it appears to me, that although their statements are perfectly correct, in as far as they relate to the inadequacy of the syringing process, they have greatly underrated the capacity and the usefulness of the probe, on which Anel so greatly relied. In consequence, then, of the presumed insufficiency of Anel's surgical proceedings, various modes of maintaining the due patency of the lachrymal conduits were suggested, and, though not yet discharged from practice, many of them appear to me to be painful and tedious in their operation, and most uncertain in their result, and, in making these remarks, I especially refer to the operative proceedings recommended by Le Morier, Mejan, Cabanis, and Vacca.

---

* *Nouvelle méthode de guérir les fistules lacrymales.* Turin, 1713.

† " La méthode d'ANEL est insuffisante en beaucoup de cas." *Mémoires de l'académie, royale de chirurgie,* Tome ii. page 193.

‡ Cette méthode est ingénieuse, mais souvent le vice local n'est pas tel qu'il puisse être détruit par des injections. Si le canal nazal est obstrué ou fermé par des tubercules calleux ou par des cicatrices, l'obstacle sera de nature à ne pouvoir être emporté par les injections, et le stilet introduit par les points lacrymaux, sera trop foible pour déboucher le canal." *Mémoires, &c.*, Tome ii. page 201.

§ " The passage of a small probe through the puncta, has a plausible appearance, but will, upon trial, be found very unequal to the task assigned; the very small size of it, its necessary flexibility, and the very little resistence it is capable of making, are manifest deficiencies in the instrument: the quick sensation in the lining of the sac and duct, and

3.—*Fistula of the lachrymal sac, produced by the accretion of the lower edges of the nasal duct.*—The point at which the nasal duct opens into the nose may become closed; this has occurred under my own observation in persons in whom repeated attempts have been made to introduce an instrument through the nostril into the nasal duct, as advised by De la Forest, Bianci, Allouel and Gensoul, and practised by many surgeons of the present day. It appears to me, that it will rarely be necessary to do more in cases of this description than to pass a probe through the external opening into the nasal duct, and gently and cautiously force it through the point of union, gradually increasing the size of the opening by augmenting the magnitude of the probe, and regulating the frequency of its introduction by the effects it produces. As soon as the nasal duct is properly opened, the tears will

its diseased state, are great objections, on the side of the parts, supposing that it was capable of answering any valuable end, which it most certainly is not." *Observations on that disorder of the corner of the eye commonly called fistula lachrymalis.* London, 1772.

pass into the nose as usual, and the opening in the skin, if it do not then heal, may be readily made to do so by changing the character of its edges and of its surface, and by preventing the transit of the tears from the sac, upon the sore.

4.—*Fistula of the lachrymal sac occasioned by extensive obliteration of the nasal duct.*—There are three modes of attempting relief in a case of this description; first, by the use of ANEL's probe; secondly, by the introduction of a style; and lastly, by the perforation of the os unguis. In the first method a probe may be passed down to the point of obstruction, and slightly pressed upon the part for about a minute; this may be repeated every other day, if the previous use of the probe has excited no material degree of irritation, and the pressure employed on each occasion may be cautiously increased until the probe eventually passes into the nose. In this way an artificial channel for the tears is formed through a substance, which consists, for the most part, of the sides of the nasal duct and a quantity of lymph, consolidated by inflammation, and organized. I am aware that this cannot always be done; that the attempt to do it sometimes excites great pain and produces severe inflammation, and that it is necessary to adopt some mode of procedure which shall more promptly restore the proper course for the tears. For this purpose the mode of treatment by the introduction of a style, so much improved by MR. WARE, appears to be far preferable to the use of the fiddle-strings, advised by BEER, or to the introduction of the "dossil of charpie," as advocated and practised by VACCA. The following is MR. WARE's account of his own mode of procedure:—"If the disease has not occasioned an aperture in the lachrymal sac, or if this aperture be not situated in a right line with the longitudinal direction of the nasal duct, a puncture should be made into the sac, at a small distance from the internal juncture of the palpebræ, and nearly in a line drawn horizontally from this juncture towards the nose, with a spear-pointed lancet. The blunt end of a silver probe, of a size rather smaller than the probes that are commonly used by surgeons, should then be introduced through the wound, and gently, but steadily, be pushed on in the direction of the nasal duct, with a force sufficient to overcome the obstruction in this canal, and until there is reason to believe that it has freely entered into the cavity of the nose. The position of the probe, when thus introduced, will be nearly perpendicular; its side will touch the upper edge of the orbit; and the space between its bulbous end in the nose and the wound in the skin will usually be found, in a full grown person, to be about an inch and a quarter, or an inch and three-eighths. The probe is then to be withdrawn, and a silver style of a size nearly similar to that of the probe, but rather smaller, (about an inch and three-eighths in length, with a flat head like that of a nail, but placed obliquely, that it may sit close on the skin,) is to be introduced through the duct, in place of the probe and to be left constantly in it. For the first day or two after the style has been introduced, it is sometimes adviseable to wash the eye with a weak saturnine lotion, in order to obviate any tendency to inflammation which may have been excited by the operation; but this in general is so slight that I have rarely had occasion to use any application to remove it. The style should be withdrawn once in the day for about a week, and afterwards every second or third day. Some warm water should each time be injected through the duct into the nose and the instrument be afterwards replaced in the same manner as before. I formerly used to cover the head of the style with a piece of diachylon plaster spread on black silk; but have of late obviated the necessity for applying any plaster by blackening the head of the style with sealing wax."[*]

*Mode of performing the operation for fistula of the lachrymal sac.*—With a small scalpel, I make a horizontal incision about two-fifths of an inch in length, immediately beneath the tendon of the orbicularis muscle, quite into the sac, through this incision I introduce a large lachrymal probe and urge it downwards into the nose,[†] and having done this and withdrawn the probe, I pass a fine bit of bougie into the aperture, and bend its extremity a little over the skin so as to prevent it from slipping into the sac, and then confine it in its situation by means of adhesive plaster and a narrow roller. After this has been worn a few days, and measures taken to remove any irritation its presence and the operation necessary for its introduction, may have excited, I procure a small nail-headed WARE's style, and introduce it in the same manner as I inserted the bougie, and direct the patient to wear it for some time.

It might be supposed that the constant residence of a solid foreign body in the nasal duct, would, on a *prima facie* view of the subject, have two highly injurious effects —first, that of exciting great irritation, and secondly, that of blocking up the nasal canal so completely that the passage of the tears would be entirely obstructed; but, instead of this, the tears flow by the side of the style, the part becomes widened from the absorption caused by the pressure of the style, and, in the course of time, a sufficient channel for the tears is established. Indeed, so great is the benefit its use occasions, that patient's often say, in the course of a month or two after it has been introduced, "the part is quite well, the tears flow properly, and I need not wear this style any longer," and if, under this impression, they remove it too soon, the duct becomes again obstructed, another operation must be performed, and the case must be managed just as before. There is a very great tendency to recurrence of mischief in these cases, and the style generally requires to be worn a long time before the cure is completed, so that it should never be removed for any length of time, for at least three months after it has been first introduced (except for the purpose of cleaning, which may be done two or three times a week), and we must be quite assured that the nasal duct is fully opened, before we recommend the patient to discontinue the use of the style. I am desirous to explain that the introduction of a style does not produce advantages as was formerly supposed, by connecting, as it were, the tube formed by the superior, with that formed by the inferior part of the excreting lachrymal apparatus, and by furnishing a channel through its centre for the passage of the tears. The style which was used many years ago consisted of a hollow tube; it was introduced in the situation of the obstructed sac and nasal duct; and the skin was healed, or was attempted to be healed, over it, in the expectation that it would constitute an artificial channel for the transmission of the tears into the nose: but the fact is, the tears pass by the side of the style, the pressure of the style causes the absorption of the immediately surrounding parts, they acquire a surface which is not disposed to unite with its opposing surface—and, as soon as these things are effected, the style may be advantageously removed, for the tears will then maintain the patency of the channel which has been formed, and the cure is as complete as the nature of the case permits.

---

[*] *Observations on the ophthalmy, and remarks on the fistula lachrymalis*, page 403. London, 1805.

[†] If the bulb of an ordinary probe cannot be passed, one a little sharpened at its extremity may be used.

The bones in the neighbourhood of the sac may be diseased, and the disease, this state of things constitutes, forms a part of general surgery, upon which I shall not enter, but I may remark that, if the disease of the bones be considerable, the case may be very tedious, no cure of the fistula should be attempted, but we must wait till exfoliation has taken place, till the progress of the caries is stopped, before the cure of the lachrymal fistula is attempted. When the fistulous aperture is very small, and its edges smooth and hard, a fine pointed piece of steel wire heated to a white heat may be introduced within it, for the purpose of destroying its margin, or it may be picked up and its edges paired. Sometimes the fistulous aperture is surrounded by a great extent of ulceration, the characters of which will determine the precise nature of the applications it may be judged prudent to recommend, but I am very careful how I order any very irritating or stimulating applications to them, and particularly whilst the tears continue to flow upon their surface, on account of the great disposition which exists under such circumstances, and in this situation, to the occurrence of erysipelatous inflammation.

Instead of performing the somewhat painful and extensive operative proceeding which is required for the proper introduction of a style, it has been suggested to permit the fistulous aperture to remain, and to reduce it to a small, pale, and nearly imperceptible point—a sort of capillary aperture—through which the tears may be allowed to flow. I apprehend this is a question for the patient rather than the surgeon to determine, but I have had several persons under my care, who were suffering from obstruction in the nasal duct, and who would neither submit to the introduction of a probe, nor of a style, and who continue to have an opening such as I have described, communicating with the lachrymal sac, which is, under an unusually free secretion of tears, somewhat troublesome, but it is neither painful, nor is the aperture perceptible to casual observation.

To epitomize my opinions respecting the treatment of fistula of the lachrymal sac:—

1.—If any polypous disease, or if any inflammation of the lining membrane, or of the skin covering the excreting lachrymal organs exists, it must be removed prior to the adoption of other treatment.

2.—If there be a small fistulous opening remaining after the due patency of the sac and duct are secured, it may be cured either by changing the character of its margin, by the application of a small heated wire; by the use of the nitrate of silver, worked to a fine point; or by cutting away the fistulous edges, by means of the curved scissors.

3.—If a large external sore remain, instead of a small fistulous aperture, after the obstruction or obliteration of the lachrymal sac and ducts is removed, it will require applications varying with the character of its surface.

4.—If the lachrymal sac be narrowed, or totally obstructed at its inferior part, just as it merges into the nasal duct, the lachrymal probes should be introduced at proper intervals, and the natural channel be, if possible, restored.

5.—If the nasal duct be strictured, or wholly occluded at its inferior part, the lachrymal probe should be frequently introduced, and, if the natural passage for the tears cannot be re-established, the probe must be passed through the mucous membrane into the nose two or three times during the week.

6.—If these means fail to effect a passage for the tears, if the obstruction be considerable and cannot be removed by the use of the lachrymal probe, a style may be inserted in the manner I have already pointed out and may be worn with the precautions suggested.*

7.—Instead of performing an operation for fistula lachrymalis, the external opening communicating with the sac, may be rendered as small as possible, and be then suffered to remain.

*Probing the lachrymal passages.*—On concluding these observations on fistula lachymalis, I shall briefly describe the method of introducing the lachrymal probe. If operating upon the right eye of a patient, direct him to sit upon a chair, with a low or short back, and to lean the head a little backwards, the surgeon should then place himself behind the patient, standing at a convenient height, and support his head upon the chest, then taking the probe within the two first fingers and the thumb of the right hand, and everting the upper lid with the index finger of the left, attempt to pass it within the punctum, but if this cannot be accomplished, introduce a blunt-pointed pin, and rotate it for a few seconds, and afterwards attempt the introduction of the probe within the punctum, which may generally be effected with great ease; the operator should first direct the probe obliquely upwards, then pass it in an horizontal direction towards the inner canthus, when, having passed it as far as he is able without employing an injudicious degree of force, he should turn its point downwards and a little backwards, pressing that part of it which is immediately below the supra-orbitrary ridge, as near to the eye-ball as possible, when, if no unusual obstacle exist, the probe passes into the nostril, and the patient will generally inform him of its presence there. Sometimes the parts are irritable, and the probe cannot be introduced without the use of a much greater degree of force than it would be prudent to employ; and, in such cases, it would be better to withdraw it, and not persevere, but try to introduce it a day or two afterwards. When the introduction of the probe occasions much irritation and inflammation, such inflammation must be entirely removed before it is again passed, and, as a general rule, it may be stated, that the part may be probed at first twice, and afterwards three times a week. However, the best rule for our guidance is derived from the effects produced by the use of the probe on the first few occasions, for some patients will bear its introduction very well every day, or every other day; whilst, in other persons, it would be highly improper to probe these parts more than once a week, and it will be then necessary to administer purgative medicine, and to use cooling lotions, and to adopt other precautions immediately, and for a few days afterwards.

---

* In the early operations for the cure of fistula of the lachrymal sac, a hollow tube was passed through the os unguis into the nose, and the skin was healed over its head; afterwards, a tube of the same description was introduced into the nasal duct, and the skin united over it; subsequently the same proceedings were adopted, except that the style was composed of a solid piece of metal—having no canal in its centre; at the present time, the style chiefly used, resembles a thick piece of wire, having a flattened head which remains out of the wound.

## SECTION XX.—CONGENITAL DEFECTS OF THE LACHRYMAL APPARATUS.

I have never met with a case in which the lachrymal gland has been wanting from birth; even in the few instances I have witnessed, in which the eye-ball has been no larger than a small pea—a mere rudiment of an eye—there has been a distinct secretion of tears for some time after birth. I have known the puncta to be unusually small, not from any constriction produced by disease, but from original formation, and, in two instances, no puncta whatever have been seen; but I cannot tell whether or not the congenital absence of the puncta was the only defect which was present, as I could not obtain permission to satisfy myself upon this point by the introduction of a probe through the nostril; but tears were, in both instances, freely secreted, and, of course, there was present a lachrymal gland; the patient was annoyed with a constant stillicidium lachrymarum. I have seen several children with one or both eyes of a very small size from birth—so small, indeed, that their respective parts were scarcely to be distinguished. At first the lachrymal fluid has been pretty freely secreted, but, in the course of a few years, the surface of the eye has become dry,—the conjunctival secretion has ceased—and the lachrymal puncta which, in the first instance, were distinctly perceptible, became occluded, or, if present, so minute as not to be distinguished. The conjunctival surface of the eye has been converted into a thin, and pale-red membrane, like very delicate skin; the tears flow upon it pretty much as water would pass over dry parchment, and stream down the cheeks;—in fact, the lachrymal puncta would appear to become obliterated. The conjunctiva does not always degenerate into a pale-red and dry membrane, for I have observed it acquire a dirty hue, having pretty much the appearance termed "whity-brown."

But the most frequent congenital defect of the lachrymal apparatus I have witnessed, has been a sort of capillary aperture in the lachrymal sac. In all the instances I have seen, the opening has existed on both sides, the tears have not passed into the nose, but have flowed down the cheeks. I have never heard that the defect has been cured, and, in my own practice, I have never thought it adviseable to suggest any measures for that purpose. The defect is scarcely perceptible to ordinary observation, and it is only when the tears are secreted in unusual abundance, that it gives rise to any inconvenience. The following case will illustrate the characters and various circumstances connected with this congenital defect.

CASE.—Amelia RHODES, ætat. 7, was brought to me by her parents, on account of a small opening at the side of the nose, and just in the situation of the lachrymal sac, through which a limpid fluid was observed to exude. The defect has existed from birth, and has refused to yield to the eye-salves and collyria, which have been recommended by the various persons to whom she had applied for relief. The opening was extremely minute, its edges were scarcely at all indurated or raised; it appeared pretty much like such an opening in the skin as might be formed by passing into it a large needle. On pressing the parts around the aperture, a small globule of limpid fluid slightly projected from it, which disappeared on the remission of the pressure. The lachrymal puncta were properly formed, and the child enjoyed good vision. I directed the parents to do nothing whatever to the parts, but to procure advice immediately if the weeping from them ceased, or if a tumour formed, or if inflammation occurred, in their neighbourhood.

## SECTION XXI.—EXTIRPATION OF THE LACHRYMAL GLAND.

If the lachrymal gland be not materially enlarged, and if it have acquired no morbid adhesions to surrounding parts, nothing can be easier than to remove it by an incision through the skin and orbicular muscle of the eye-lids; but it is not often required to be removed under such circumstances, so that in giving an account of the method of extirpating the lachrymal gland, I shall suppose it to be much enlarged, and to have acquired adhesions of a more or less firm description to the parts with which it is naturally connected by merely the slightest attachments.

The patient should be placed in the recumbent position, with the head and shoulders slightly raised, and, having extended the palpebral integument over the margin of the enlarged gland, and over the surface of the eye-ball, the operator should divide, by a free incision, made in a direction parallel with, and immediately beneath, the orbital margin, the skin of the eye-lid, and afterwards the fibres of the orbicularis muscle, and that portion of cellular and fibrous membrane which generally intervenes between them and the surface of the diseased gland. If the incision (which must be at least two inches in length) does not afford sufficient room to remove with freedom the part it is intended to extirpate, two other incisions should be made, one from the temporal termination of the horizontal incision obliquely outwards towards the ear, and, of course, beyond the external commissure of the lids, and the other from the opposite extremity of the horizontal incision, directly downwards towards the tarsal margin; the flap so formed should be then dissected downwards, the surface of the enlarged gland fairly exposed, a hook should be then fixed in its substance, and any adhesion it may have contracted partly destroyed by the handle, and partly divided by the sharp edge of the knife. If the cutting edge of the knife be freely used at this stage of the operation, severe hæmorrhage may arise, for it will be remembered, that the vessels passing to the diseased gland will be much enlarged. As soon as the tumour is removed, and the hæmorrhage suppressed, the edges of the wound should be brought together, either by means of adhesive plaster or by the aid of sutures, as circumstances may render necessary. But before this is done, it would be adviseable to examine carefully into the state of the orbit, to see that no part of the gland remains behind, and that there does not exist any undue degree of induration of the orbital cellular membrane, and, of course, it would be necessary to secure any vessel which may seem disposed to bleed; for, if hæmorrhage continues after the wound is closed, the orbit will become distended with coagula, the external wound may be prevented from healing, or the eye-lids may slough, or it may be necessary to re-open the wound, clear away the coagula, and dress it up a second time.

After the operation, the lid should be kept quiet by means of a light roller, the parts bathed with a cooling lotion, and mild beverages merely should be taken for the first forty-eight hours. The patient should also keep his bed for at least three days subsequent to the operation.

# CHAPTER XXIII.

## AFFECTIONS OF THE EYE-LIDS.

INTRODUCTORY REMARKS.—The eye-lid has an external cutaneous, and an internal mucous surface, between which, a quantity of peculiar cellular and fibrous membrane; the fibres of the orbicularis muscle; the expanded tendon of the levator palpebræ; the tarsal cartilage; the Meibomean glands and their ducts; and the capsules for the reception of the bulbous root of the eye-lashes—are situated.

The ciliary margins of the eye-lids are brought into apposition by the action of the orbicularis muscle, and the superior lid is raised by the agency of the levator palpebræ. It is particularly necessary to be well acquainted with the action, the precise situation, and the connexions of these two muscles, in many forms of disease of the eye-lids, and especially in ptosis, entropium, and ectropium.

The tarsal cartilage is situated between the conjunctiva and the orbicularis muscle, the fibres of which are scattered upon its surface. The size and somewhat crescentic figure of this cartilage may be readily ascertained by everting the lid upon a common probe. It is important to notice that its inferior or ciliary edge is sloped—slightly inclined—from within outwards, so that when the lids are closed, it forms, with the opposing ciliary margin, at the expence of the extreme border of its inner or ocular edge, a fine triangular groove, along which the tears flow towards the lachrymal puncta, so that the tarsal margins only *accurately* meet at the external, or cutaneous edge of their lower border. The tarsal cartilage is somewhat concave on its interior, so as to be adapted with the most beautiful exactitude, to the surface of the globe. The tarsal cartilages are connected to each other at their fine termination near the nose by means of a thin ligamentous band, which is inserted into that part of the internal angular process of the frontal bone where it joins the nasal process of the superior maxillary bone. The cavities for the reception of the bulbs of the eyelashes are placed on the cutaneous aspect of the tarsal cartilage, whilst the Meibomean glands are lodged in minute depressions formed at the lower margin of its mucous aspect. I do not profess to enter at all minutely upon the anatomy of the eye-lid, but I am satisfied that it is perfectly in vain for any medical practitioner to attempt to comprehend the morbid affections of the palpebræ, much less to adapt, with any prospect of due success, his surgical proceedings to the relief of many of them, unless he is well acquainted with the anatomy of the parts and textures which enter into their composition, and especially with the extent and connexions of its fibrous textures—the form of the tarsal margins, and the anatomical qualities of the surface which intervenes between the decidedly cutaneous and mucous structures at the ciliary border of the palpebræ—the form and connexions of the tarsal cartilage, and the operation of the fibres of the orbicularis and levator muscles upon them—the number and situation of the Meibomean glands, and the situation of their ducts and openings—and with the arrangement and situation of the capsules of the bulbous roots of the eye-lashes.

## SECTION I.—INJURIES OF THE EYE-LIDS.

Injuries of the eye-lids may be conveniently considered under the following arrangement;—1, contusions of the eye-lids;—2, burns and scalds of the eye-lids;—3, injuries to the eye-lids from various caustic and irritating substances;—4, incised and lacerated wounds of the eye-lids.

CONTUSIONS OF THE EYE-LIDS.—A blow upon the eyelids, inflicted by various resisting bodies, may occasion, according to the nature of the substance producing the injury and the force with which it was applied, various effects, in addition to mere contusion, but I shall only consider at present contusions of the eye-lid.

The most usual and promptly developed effects of contusion of the lids, are inflammation and ecchymosis; the loose cellular membrane of the eye-lids readily permits an extensive extravasation of blood, which is poured out in such quantity as to distend the lids enormously, and effectually prevent them from being separated so as to expose the surface of the eye. Now, in this case, the enlargement of the palpebra is produced by various causes:—1, by the vascular congestion of the part;—2, by serum, which is produced by the inflammatory state of the part, by the obstruction to its circulation, and, as a separation from the thicker portion of the blood, which coagulates, and constitutes the third, or remaining cause on which the enlargement of the part depends, and gives rise to that dark-coloured appearance which is familiarly termed "a black eye." The treatment of such a case is sufficiently obvious, and I shall not enter upon the subject at all in detail. If there be much inflammation, the case must be treated by antiphlogistic remedies, such as, bleeding from the arm, the administration of purgatives, and confinement to a low [illegible] bathed with some soothing lotion. I [illegible] with a warm [illegible] of poppies, and the [illegible] it be necessary to take blood from the part, it would be better to open a vein in the neighbourhood, rather than apply leeches, which may produce great irritation, and add to the swelling. I have often opened, with great advantage, one or two prominent veins which may generally be seen about the palpebræ, and by bathing the part well with very warm water, have thus obtained a considerable quantity of blood. When the lids are much swollen, very tense, and of a deep-red or livid colour, it would be advisable to puncture them, and discharge the serous part of their contents, and this may be done with a fine lancet, not by making free incisions, but a few small punctures into the part. The object of making these punctures is to relieve that tension and inflammation which, if permitted to continue, will be likely to cause mortification, for, in scarcely any situation of the body will sloughing be more likely to occur after an injury of this kind, on account of the great quantity of cellular membrane which enters into the composition of the eye-lids.

BURNS AND SCALDS OF THE EYE-LIDS.—This form of injury is often followed, when severe, extensive, or mismanaged, by great deformity of the part, and, consequently, by a certain degree of interruption to perfect vision. I shall not enter upon a description of the mode in which a burn or scald produces the mischief to which they are so well known to give rise, but shall briefly mention one or two points connected with the management of these injuries when affecting the eye-lids, which are not, I think, generally sufficiently attended to. The first object of attention in these cases is to lessen the irritation they always produce, and, if the burn or scald be very slight, that will be readily accomplished by the means usually employed for this purpose; but it may happen that the part may be more severely injured, that the cuticle may be detached and elevated by serous effusion, and the true skin much inflamed; and, in this case also, nothing more is required, than an attention to the customary mode of controlling a similar extent of inflammation, when excited from other causes; but, with regard to the puncturing of the blisters, which are generally present, great care is requisite, both in determining the propriety of performing, and in the method of accomplishing, this trifling operation. Whenever the blisters are so large as to produce much uneasiness, they should be punctured with a fine needle, so as to make an aperture just ample enough to permit the gradual discharge of the fluid they contain, without detaching the cuticle so as to expose an extensive surface of the denuded skin. Lastly, the injury may be so severe as to excite sloughing and ulceration of the part. After the detachment of the slough, the case is merged into one of mere ulceration, and, in conducting the management of this part of the case, it is of the first importance to prevent, if possible, any deformity from occurring, such as ectropium, or any variety of deformity of the tarsal margin: I have long been in the habit of binding down the eye-lid upon the globe, during the healing of extensive ulceration of the cutaneous surface of the palpebræ, (which ulceration evinces a tendency to induce ectropium or trichiasis,) so as to cause the eye-lid to preserve its ordinary closeness and accuracy of adaptation to the surface of the globe. However, the part may heal, and the loss of skin, together with that contraction connected with the formation of a cicatrix, may produce ectropium, and then, if the cicatrix be favourably situated, we may excise it, and either allow the part to granulate a second time, taking better precautions to prevent the eversion of the eye-lid, or, we may supply the place of the excised cicatrix, by a portion of skin, accurately adapted to fill up the vacancy, taken from some neighbouring part; and where there is a loss of skin from extensive sloughing, this effect of the injury may sometimes be relieved by the same surgical process.* Where extensive ulceration of the eye-lid exists, or after acute inflammation and extensive suppuration of the orbital cellular membrane, the palpebra is liable to become attached to the periosteum within the orbit or at its edge. I mention this circumstance with a view of directing especial attention to the risk of this most untoward occurrence, in order that the surgeon may be prepared to watch cases of this nature with the most anxious care, and with particular reference to the probable occurrence of this annoying affection.

---

* Case.—*Ectropium from a burn, greatly relieved by a surgical operation.*—A few months ago I was requested, by my friend Mr. Wilcox, to see a young married woman, who, in consequence of a severe burn, had suffered from a troublesome form of ectropium, which gave her a very disagreeable and almost disgusting appearance. On an attentive examination of the case, I found that the lower lid was greatly everted, that its mucous lining was extremely vascular and that there was present a bad form of stillicidium lachrymarum. The skin beneath the eye-lid was very firm and rigid, and elevated into various tuberculated and intersected lines, somewhat resembling the carneæ columnæ of the heart; one of these, very strong and much elevated, passed a little beyond the inner canthus upon the side of the nose. I suggested the following operation, which Mr. Wilcox performed with great care, and with a very successful result.

*Operation.*—Having included nearly the whole of the cicatrix (which was half-an-inch in breadth at its widest part) within an elliptical incision, he carefully dissected it from the muscle beneath, taking the precaution not to cut too near the hardened skin; he then removed (with the exception of a little band near the outer angle of the eye) a portion of skin from the temple, of such a figure as to fit quite accurately in the space left by the excised cicatrix; this portion of healthy skin was fixed in its new situation, by means of an appropriate number of sutures. In the course of a week the patient's appearance was very much improved, and at the present time there is no appearance of ectropium; but the eye is scarcely in such perfect contact with the globe as is usual, there is a little difference between the colour of the *old* and that of the *intruded* skin, and also a scarcely distinguishable line denoting the course of the incisions.

INJURIES OF THE EYE-LIDS FROM VARIOUS CAUSTIC AND IRRITATING SUBSTANCES.—The effects of such injuries will be either to excite a certain degree of inflammation, or, to destroy at once the vitality of the part. Inflammation of the eye-lid will be treated of hereafter, together with abscess of the palpebræ, and I have already pointed out the measures it might be necessary to adopt where ulceration existed, and where there is either ectropium produced or any loss of the substance of the eye-lid sustained. The prevention of these effects—that is, eversion of the eye-lid, or loss of part of its substance—greatly depends on the judicious management of the case at its first stage.

INCISED AND LACERATED WOUNDS OF THE EYE-LIDS.—Cases of this kind are to be managed just as similar forms of injury occurring in other situations, are to be treated, except that the surgeon should be perhaps even more careful to preserve the figure of the part, and to insure the most absolute precision of union. It is of the highest importance to maintain the due adaptation of the eye-lid to the surface of the globe; and the most perfect evenness of the tarsal margin: if it be rendered unequal—if the slightest irregularity of that part exist—deformity necessarily occurs, and, very probably, ectropium, or mischievous distortion in the position and direction of the eye-lashes will take place. If the injury consist of a simple incised wound, its edges may be carefully brought together, with very fine sutures, and a few narrow strips of adhesive plaster, and the part kept quiet by passing a roller lightly over the lids of each eye, and the patient be directed to live on low diet, and to avoid, as much as possible, every thing which requires great exertion of the muscles of the face or scalp. The sutures possess the advantage of fixing the parts very securely, and of insuring greater precision of union than can be obtained by means of sticking plaster alone. If the wound be a lacerated one, other measures are required, for, either loss of substance may be expected to occur, or the wound may not heal by the first intention but by a process of granulation. Now, in addition to the union of the wound, in a case of this description, every measure must be adopted which is calculated to lessen inflammation, if that exists. If the injury the part may have sustained be of a nature to lessen its vitality, or, if a portion of the eye-lid is so torn that a great part of its vascular connexions are destroyed, and it feels colder than the other parts of the lid, and yields the other indications of impaired vitality, we must have recourse to *warm*, not *hot*, applications, and cherish its vital powers by every local measure, taking care not to employ any pressure upon the part, nor any lotions or fomentations, but instead of them, place a small bag of heated bran upon the part, and renew it as frequently as circumstances require, giving at the same time stimulants, if the state of the system indicate a necessity for their use. A wound of the eye-lid towards its temporal side may leave behind a fistulous aperture, through which the tears may be discharged. In fact, the ducts carrying the tears from the lachrymal gland to the tarsal margin may be severed, and the fluid they convey, may, in consequence, pass through the opening in the eye-lid. I have already spoken of the treatment of this form of injury of the eye-lid (see page 633.)

## SECTION II.—CONCRETION OF THE TARSAL MARGINS (ANCYLOBLEPHARON) AND ADHESION OF THE EYE-LID TO THE EYE-BALL (SYMBLEPHARON.)

CONCRETION OF THE TARSAL MARGINS.—This disease may exist wholly or partially as a result of acute inflammation, or extensive ulceration, of the lids, or as a consequence of some mechanical injury; and, lastly, it may exist as a congenital defect; and, in nearly every instance, the eye beneath is more or less disorganized, and its vision impaired. When the union of the tarsal magins does not extend throughout the whole of their surface, the eye appearing unchanged in size and figure, it is desirable to separate the adhesion, and retain the divided edges asunder by artificial means, until the healing process is completed. I have seen this event occur, that is, union of the tarsal margins, nearly throughout their entire extent, but there has been an aperture at some point through which the tears, and the mucus which is secreted by the conjunctiva, have been discharged. And it remains with the patient, whether or not, under such circumstances, he prefers to submit to an operation for the separation of the united lids, so as to be enabled to wear an artificial eye. It is not at all probable that the borders of the eye-lids will unite entirely whilst the eye retains its natural form and magnitude, and the lachrymal gland duly performs its functions; for, the secretions beneath, by their constant passage outwards, prevent the union of the tarsal margins for a certain space. It appears to me, that when the defect exists (for I am not now entering upon the description of the means of preventing it, but am presuming that it has already taken place) it should be removed under the following circumstances. When there is merely a small aperture between the lids, through which the lachrymal, and other secretions pass, the eye-ball being collapsed, and no adhesion existing between the eye-lids and globe, and the patient desires the performance of the operation, merely to enable him to wear an artificial eye, on account of personal appearance. Secondly, when the adhesion is very partial, and not extensive, the eye beneath being tolerably healthy. And lastly, when the defect is congenital, the intertarsal slit being absent, and the existence of the eye inferred from an external examination.

My mode of performing the operation, consists in passing a small flexible director beneath the united lid, (if there already exists an opening, or if not, I previously make one by careful and repeated sections in the situation of the intertarsal slit) and, with a small knife, introduced within, and adapted to, its groove, having a slightly convex cutting edge,* I divide the parts from within outwards. Different cases will require different modes of procedure, but I believe a trivial modification of this method will be adapted to nearly every case.†

ADHESION OF THE EYE-LID TO THE EYE-BALL.—This may take place throughout the whole extent of those surfaces of these parts which usually move upon each other, or, as more generally happens, it may occur only very partially, forming frenulæ or strings of adhesion between these respective parts, and limiting, in consequence, the motions of the eye-ball. Symblepharon usually proceeds from burns or scalds of the eye, from the application of caustic substances to its surface, or from the long continued existence of acute inflammatory chemosis. When the adhesion occupies a great extent of surface, it would be improper to interfere, for it would be next to impossible to separate the adhesions without puncturing the eye-ball and inducing its collapse; and it would be of no use, as the globe of the eye would, as a necessary consequence of that extent of disease or injury which had led to the extensive accretion of the eye-lid to the globe, be unfitted for the purposes of vision. When the adhesion has only taken place throughout a small extent of surface, the eye appearing tolerably healthy, the adhesions which exist may be carefully separated with a fine scalpel, and endeavours made to preserve this separation, by frequently moving the eye-lid upon the eye-ball, and by introducing a little olive oil beneath the lids, but it is an extremely difficult thing to maintain this separation. I have, in a few instances, advantageously adopted the following method:—having withdrawn the eye-lid as much as possible from the surface of the eye-ball, immediately after its connexion with the globe has been destroyed with the scalpel, I have then fixed it, and protected the eye from the influence of light, and covered it with an ordinary green shade, for two or three days together, when the surfaces of the sore are become much less inclined to coalesce than they were immediately subsequent to the operation. When the motions of the eye-ball are limited merely by the existence of one or two frenulæ, the division and excision of them by a probe-pointed pair of scissors, is all that is required; but when the adhesion is broader, whether the consequence of the contact of quick lime, the result of ulceration from disease, or from the application of some caustic or irritating substance, I dissect the morbid band of adhesion from the surface of the eye as carefully as possible, avoiding puncturing the eye-ball, and, at the same time, removing the matter of adhesion as near to the globe as I can consistently with its safety; and, having done this, I cut away the superabundant portion of this band, and treat the case in every respect as after the operation of separating the lid from the globe, when more extensive adhesions exist. I remember seeing a child, a short time ago, in whom an adhesion of this kind existed, it was broad at its base, and pointed towards the cornea, upon the surface of which it extended for about a line, it was situated at the lower and outer part of the eye, and was considered to be a pterygium by several gentlemen who examined it, but, as it was not placed at the outer canthus in the direct transverse diameter of the eye, and as its appearance was more cutaneous than that of pterygium, I thought differently, and the mother afterwards explained that the child had had some mortar thrown into the eye several months before, which was followed by great inflammation, and that the substance now seen on the globe, grew after the inflammation was cured. It is just possible, therefore, that a band of adhesion subsisting between the palpebræ and the globe of the eye, and produced by the contact of lime with the conjunctiva may very closely resemble a pterygium, and be mistaken for that disease, unless it be very carefully examined, and its history diligently investigated—the points of distinction comprise its history, (more particularly as respects its mode of origin and its progress) its situation, and its visible anatomical characters.

---

* The instrument, when fitted in its director, resembles the sheathed hernia knife, invented by MR. HANMER, of Chester.

† The ancient mode of operating in cases of *ancyloblepharon* consisted in passing a needle, armed with a piece of silk, between the globe and the united palpebræ from the outer to the inner canthus, and then tying the two ends of the silk to a weight. The *cure* took place from the mechanical effect of the silk upon the joined lids—partly by sawing the skin whenever the silk was moved by the movements of the patients, and partly by producing ulceration. One very important object, contemplated by the practice of surgery, appears to have been accomplished by this rough and barbarous mode of procedure—the patients "did well."

## SECTION III.—PHLEGMONOUS AND ERYSIPELATOUS INFLAMMATION OF THE EYE-LIDS.

PHLEGMONOUS INFLAMMATION OF THE EYE-LIDS.—The eye-lids are liable to idiopathic phlegmonous inflammation, which may pursue the ordinary course of this form of inflammation, and, if severe, neglected, or mismanaged, may terminate in extensive suppuration, in consequence of the large quantity of cellular membrane which enters into the composition of the eye-lids.* The inflammation itself requires the same treatment as external phlegmonous inflammation in other situations, but when it has proceeded to suppuration, the utmost care must be taken to prevent that deformity, which incisions and cicatrices of these parts are so apt to leave behind. There is one circumstance to which I am disposed to direct particular attention;—when the inflammation has proceeded so far that suppuration is inevitable, the skin being very red, and the part exceedingly painful and tumid, it would be most necessary to make slight punctures into it with the point of a lancet, to relieve the inflammatory tension which exists, or extensive destruction of the palpebral integument may take place. Again, when suppuration has occurred, the matter should be early discharged, lest the skin should be more extensively destroyed, and its cellular tissue much broken down, the consequence of which will be a rigid state of the parts, which is exceedingly unpleasant, and sometimes hurtful; —unpleasant, because it will interfere with the ease and freedom of the movements of the eye-lid upon the surface of the eye, and hurtful, because it often destroys the perfect adaptation of the palpebræ to the globe, and produces lagophthalmos or retraction of the eye-lids. All incisions in this part should be made parallel with the tarsal margin—in the course of the fibres of the skin and orbicularis muscle.

In the course of the preceding remarks I have been supposing that the conjunctive membrane of the eye has not participated in the inflammation, but this is a circumstance which may take place, and which, therefore, renders increasedly necessary the employment of prompt and active treatment.

---

* Phlegmonous inflammation of the eye-lids sometimes accompanies gonorrhœal and other acute forms of ophthalmia.

**ERYSIPELATOUS INFLAMMATION OF THE EYE-LIDS.**[*]—Eysipelatous inflammation of the eye-lids is frequently a mere extension of disease from other parts, it is rarely limited to the eye itself, and it often arises when the lachrymal sac is obstructed, enlarged, or inflamed; indeed, so frequently does this occur, that **BEER** thought it necessary to speak of "erysipelatous inflammation of the parts covering the lachrymal sac," in a distinct chapter, in that part of his celebrated work on diseases of the eye, which treats of the affections of the lachrymal organs. Of course, when erysipelas is limited to the eye-lid, it is not characterised by those acute constitutional symptoms, which generally occur in the severer forms of erysipelas which occupies a much greater extent of surface.[†]

The precautions in treatment to which I shall especially request notice, are such as relate to the preservation of the size, the form, and the structure of the part; if the skin of the eye-lid be allowed to slough, or the cellular membrane of the part to become much broken down and destroyed, the serious inconveniences and deformity to which I have already referred, may occur. The treatment consists in removing feverish irritation, and derangement of stomach and bowels which are generally present; and in applying to the inflamed part some mild soothing applications. I usually prescribe pretty active purgatives, place the patient upon an abstinent diet, and direct the eye-lids to be bathed with a little simple warm water or goulard lotion, and where it agrees better, a small well made bread and water poultice, enclosed in a little fine gauze or linen, may be applied to the part. When the inflammation is more severe, the skin enormously swollen and very tense, I puncture the part in two or three places with the point of a lancet, and observe the same rules with regard to the occurrence of suppuration, which regulate my practice, when phlegmonous inflammation of the palpebræ terminates in suppuration. Of course, erysipelatous inflammation of the palpebræ is liable to extend to the conjunctiva, and, when this is the case, the disease so induced is termed *erysipelatous conjunctivitis*, of which I have already treated when discussing the acute inflammatory affections of the conjunctiva.

---

[*] The varieties of erysipelatous affections of the eye-lids correspond with those which exist when the disease is situated in other parts of the body. I have described the characters of these varieties (*phlegmonous—bilious—œdematous—gangrenous*) more minutely than it would be proper to do here, in the second volume of the *Midland Reporter*.

[†] The œdematous variety of erysipelas of the eye-lids very often exists in a slight degree in catarrhal ophthalmia, and in various forms of inflammation of the eye, occurring in feeble and debilitated persons.

## SECTION IV.—CANCER OF THE EYE-LIDS.

The eye-lids are liable to cancerous disease, which is preceded by scirrhous induration, as in other parts. The induration is considerable, and almost always occurs near, but not close to, its tarsal border; it is attended by lancinating pain, and, after a certain duration, it ulcerates, the sore possessing the same characters as cancerous ulceration generally. Its progress also resembles it, and likewise its termination. It occurs in advanced life, and is not, as far as I can recollect, at all uniformly consequent on any particular form of previous disease of the eye, or any peculiarity of circumstances connected with the use of that organ. The disease would appear to commence in the cellular membrane beneath the skin, for, at first, the skin is slightly moveable upon the rather trivial induration beneath; when the skin becomes adherent to this indurated matter, it also becomes discoloured, and, at its summit, has a dark livid appearance, and the tumour, which was previously pretty even on its surface, becomes nodulated and irregular, and the vessels in its neighbourhood become much enlarged and varicose. At this period, ulceration is about to take place, the glands in front of the ear and beneath the jaw begin to enlarge, the part becomes very painful, and the distinct constitutional symptoms set in, and the peculiar cancerous appearance of the face, and colour of the skin, supervene. When it does ulcerate, its surface presents the ordinary characters of cancerous ulceration elsewhere, and its subsequent history is precisely similar.

*Treatment.*—If the case is seen at an early period of its existence, if no absorbent glands are enlarged, and if no disease of other parts exist, its removal should be at once proposed, and, in order to direct due attention to the importance of the early performance of an operation, it is necessary to explain to the friends of patients the probable course and termination of this apparently trifling disease. But, if extirpation be not allowed, leeches may be applied around the scirrhous induration, but not exactly upon it, for that would be likely to produce ulceration, and the usual constitutional treatment should also be adopted. If there be much local pain, the parts may be fomented with some mild narcotic preparation, and the eye bathed with goulard water, or some similar application, if that organ be at the same time irritable or inflamed. If the case proceed to ulceration, and the patient, who before refused to submit to an operation now becomes apprehensive and desires to have the part removed, the operation may, even at this period, be undertaken with a chance of advantage, unless the disease has become very extensive, the constitutional powers undermined, the countenance very indicative of complete constitutional imbuement with the carcinomatous principles, and the absorbent glands near to, and beneath the jaws, much indurated; and, in removing the parts at this stage, it is most necessary to take away, not only the eye-lid, but the entire contents of the orbit, with every portion of the diseased skin;—to remove, in short, not only those parts which are actually affected with the cancerous ulceration, but all the immediately surrounding parts. As to the palliative measures it may be necessary to adopt in those instances where the extirpation of the diseased parts was judged to be inexpedient or impracticable, they would consist in the careful application of proper narcotic substances to the ulcerated surface, and the administration of opium, in some form or other, to relieve that intensity of suffering which would otherwise be intolerable. I have tried, in these cases, every local and constitutional means of cure which have presented any chance of affording permanent relief, of arresting the progress of disease, and of avoiding the necessity of resorting to a surgical operation:—I have administerd in the stage of scirrhus, iodine, sarsaparilla, and mercury; and in that of ulceration, arsenic, hemlock, iron, and many other *celebrated* medicines, and have touched the parts with lunar caustic, arsenical paste, strong solutions of the chloride of sodium;—but nothing has appeared to prevent it from eventually extending, so as to require extirpation. The application of leeches around the scirrhous induration, which precedes the cancerous ulceration, is the method of arresting the progress of the disease, upon which I place the greatest reliance.*

---

* For a copious account of the various remedies which have been extolled for the cure of cancer, the reader may consult the scientific work of Dr. Good, on *The Study of Medicine*, (Vol. iii. p. 361) and also Dr. Copland's excellent *Dictionary of Practical Medicine* (Part i. p. 282.) —In the fifth volume of the *London Medical Gazette*, there is an account of a "case of the cure of open cancer, by the exhibition of the chloride of soda." I have tried the chloride, as advised, (but without the slightest advantage) conceiving that it is the duty of every

## SECTION V.—SYPHILITIC ULCERATION OF THE EYE-LIDS.

Syphilitic eruptions may appear either on the cutaneous, or the mucous, aspect of the eye-lid, but syphilitic ulceration has always, according to my experience, for its first locality, the mucous membrane of the conjunctiva, or the peculiar texture at the precise tarsal margin. Syphilitic eruptions very rarely occur on the mucous surface of the eye-lid, but they take place much more frequently upon its cutaneous aspect, extending, however, quite to the tarsal margin—upon that texture which intervenes between its cutaneous and mucous aspect. The syphilitic eruptions, which occur on the palpebral conjunctiva (I have never seen them on the sclerotic portion of the conjunctiva) are generally of a pale yellow colour, and are slightly elevated above the surrounding membrane, like the same *eruptions* when they form upon the glans penis. Syphilitic ulceration only occurs on the internal surface of the palpebra, or at its tarsal margin. When syphilitic ulceration takes place upon the mucous surface of the eye-lid, it does not always produce much irritation, so that the sore may have acquired a certain magnitude before it attracts any particular notice. I have seen it in two cases as a mere abrasion of the mucous membrane, not having an indurated and tuberculated margin, but affecting a circular figure (except towards the tarsal margin), and appearing pretty much as if the mere surface of the part had been rubbed off or had been a good deal excoriated. In these cases the ulceration implicated the edge of the eye-lid, so that the disease was not concealed;

---

surgeon to test the effects of all safe means, for the relief of any rarely curable disease, which come recommended to his notice on respectable testimony.

in fact, the patient, in each case, watched the progress of the disease from the first with some anxiety, and obtained advice without delay. The ulceration was spreading when I first saw the cases, and, in one of these instances, I was only induced to suspect the nature of the disease, because a few yellowish eruptions had, within the last few days, appeared on the face and chest, and because the disease had not been arrested in its course, or in any way influenced, by the treatment which had been previously adopted. The gentleman said he had not had a venereal sore, and, certainly, there was no cicatrix, or appearance of one, either upon the glans or its prepuce. In the other instance, the patient was suffering from a sore of the glans penis, which was nearly cured. He says that the ulcer of the eye-lid was much better a week ago than at the time I first saw him. In this case there were no eruptions of any kind, ulceration of tonsils, or inflammation of the iris. The sore itself is not particularly painful, nor has it irritated the eye to the extent simple ulceration does, when so situated. The use of mercury to the production of ptyalism, with a weak zinc collyrium, succeeded in curing both these cases. The characters of the conjunctival sore, the effects of remedial agents upon it, together with the history of the case, readily determine its real nature;[*] but the question naturally arises, how is the disease produced in this part? Is it one of the secondary symptoms of syphilis, as the ulceration of the tonsils; or does it occur from the direct contact of the syphilitic poison? With regard to the eruptions, of course they take place as part of the series of the secondary symptoms of syphilis, but, I believe, that in every case I have seen, the syphilitic ulceration of the lids, and of the conjunctiva, proceeded from the direct contact of the matter from a venereal sore, and this is exactly what would be expected from the circumstance of their *first* appearing either at the tarsal margin of the eye-lid or upon its mucous surface. I make this statement after having attentively investigated the subject, at every practicable opportunity, with particular reference to this point, and I only omit to adduce the grounds of my conclusions from an unwillingness to lengthen this section so much as I should be compelled to do, if fully engaging in the inquiry.

---

[*] I shall point out the distinctions between syphilitic and other forms of ulceration of the palpebræ, in the succeeding section.

*Treatment.*—The mercurial treatment is just as necessary for the management of these sores, as for the cure of those which occur in other parts; calomel and opium, or blue pill, may be given to the production of slight ptyalism, which should be maintained, until the sore is quite healed and all hardness has disappeared.* When the sore is healed, and it is no longer necessary to administer mercury, the patient may be directed to take for a few weeks, the compound decoction of sarsaparilla. The good effects of the mercurial treatment upon a case of this kind, will soon be perceived; the progress of ulceration will be suspended, the sore will contract, will rather equivocally evince, at first, a disposition to heal, and will finally be completely healed; but, if other measures have been previously adopted, on the supposition that it was a common sore, the disease is only rendered stationary, or otherwise it advances with merely an interrupted and impeded rapidity. In some of the horrible cases, recorded in ancient works, of the destruction of the palpebræ by malignant ulceration, there is every reason to believe that the mischief was originally nothing more than the disease we are now considering. In addition to the administration of mercury, it is necessary to keep the ulcer and neighbouring parts clean, to prevent the occurrence of ophthalmia, or irritation of the surrounding structures, and, when it exists externally, it may be dressed with some mild application, such as a little spermaceti ointment, or lint dipped in olive oil. I do not think the application of the nitrate of silver or any caustic substance at all necessary, for, in the few cases I have witnessed, the disease has been cured by the measures I have already pointed out. Sometimes the disease will relapse after having been apparently cured, or nearly cured; so that it is desirable to continue treatment for a short time after the sore is healed, and not to lose sight of the patient altogether for even weeks or months subsequently.

---

* This induration is not usually observed unless the ulceration has much extended upon the cutaneous surface of the palpebra.

Syphilitic sores upon the eye-lid differ, as do those which occur in other parts, in accordance with the character of the sore from the secretion of which they are caused, as well as the constitutional condition of the individual in whom they take place. And I mention this matter particularly, inasmuch as if the surgeon were to forget this fact, and to administer mercury in every case of syphilitic ulceration of the palpebra merely because the disease was of a syphilitic nature, very erroneous practice might be adopted. If, for instance, the soothing plan of treatment were to be neglected in the management of a syphilitic sore, which assumed a phagadenic character, and the free administration of mercury to be ventured upon instead, the sore would very probably spread, would destroy the part very extensively, and would be rendered much more rapid in its progress and destructive in its course than it would otherwise have been.

## SECTION VI.—PECULIAR ULCERATION OF THE EYE-LIDS.

In February, 1834, I published the following "Observations on a peculiar ulceration of the eye-lids,"* as an extract from one of my lectures previously delivered at the infirmary. I described the symptoms of, and the various circumstances connected with, the disease from cases afforded chiefly by my own practice—from patients just as they came under my care—and before I had read any published description of a similar disease; if, therefore, I am now describing under a new name a disease which has been previously described, and representing slight or important differences in the affection, as compared with the account of authors, such difference can, in truth, only be attributed to that variation which necessarily occurs when different individuals are separately observing and describing a disease, the characters of which are numerous and not perhaps always precisely identical. I shall proceed to quote my former account of the affection, and shall then make those additions to its history which subsequent observation has enabled me to supply.

*General symptoms, progress and history.*—"The disease generally commences as a small, white, hard, tubercle, towards the inner canthus, but not quite at the tarsal margin. If you pinch it between the fingers, it is found to be remarkably hard, the skin seems implicated in the morbid change, and is not moveable upon the surface of the tubercular elevation; but you may raise it from the orbicularis muscle. If you examine the eye-ball, it is found to be quite healthy, and the mucous lining of the palpebra has not undergone any diseased alteration. There is no pain in the part; the health is probably good; and there are no indications of constitutional derangement.

---

* *The Monthly Archives of the Medical Sciences*, page 112.

"If the patient will not irritate, by picking or scratching it, the tubercle will very gradually enlarge, or a similar tubercle possessing the same characters may form near to it, and the appearance which is then witnessed is much the same as would be produced by *introducing a knotted thread or a minute white bead, or a series of them, beneath the skin of the eye-lid.*

"In the course of time one tubercle may become much enlarged, or several of them may form, not in a mass, for they do not exactly coalesce, but assuming a somewhat circular arrangement, having a depressed portion of healthy skin (its vascularity will be sometimes a little increased) in their centre; and they may occupy in their formation to this extent, three or four years,* if the patient will not pick them: at this period they begin to feel uncomfortable, and itch a good deal, so that they are generally picked or irritated, and then a little matter is discharged from their surface, sufficient to form a scale, which is soon detached, and when removed, exhibits a small sore in the centre of an elevated white knob, the surface of which is pale and depressed but by no means painful.† The ulceration continues to extend; its margin is surrounded by several small, white, knotted, indurated elevations, which possess all the characters of the original tubercle. The ulceration heals at one part of its edge, and extends in a different direction; the cicatrix, when formed, is thin, and of a pale red colour, and is surrounded by much corrugation of the skin. In the progress of the disease, the cicatrix may give way, may become the seat of ulceration, and when this has occurred, it does not subsequently heal; the part once affected—originally affected with this peculiar form of ulceration—may heal, a cicatrix may form, which cicatrix may eventually ulcerate, but when this has happened the part does not afterwards heal.

---

* Since writing the above I have seen several cases in which the disease has existed prior to the occurrence of ulceration, five or six years.

† I have not expressed myself here exactly as I could have wished. I meant to say, that sometimes only one, white, hard tubercle will form, and that ulceration may occur on its summit, and that as the ulceration extends, a series of very minute tubercles may form at the margin of the sore. It more generally happens, however, that a number of white hard tubercles form and arrange themselves in a somewhat circular manner—they affect a circular arrangement—being pretty nearly clustered, as it were, together, the ulceration taking place in that part of the skin which is surrounded by the tubercles, and which is scarcely at all altered in its qualities, or else commencing at, and involving, the base of one of the tubercles.

"The disease may have proceeded so far, and have produced scarcely any pain whatever; but at this period it soon travels towards the inner canthus, arrives at the tarsal margin, and the mucous membrane of the eye-lid becomes red and almost pulpy, like fine dusky-red velvet; the eye is rendered irritable, and frequently waters, and the injurious effect of this lachrymation is soon evinced upon the sore over the surface of which the tears, altered in their qualities and increased in quantity, flow.

"The development of the disease to this extent has generally occupied five or six years.*

"Hitherto the countenance has not indicated the existence of much pain, nor has it exhibited any signs of the presence of a malignant disease, but as soon as the sore has extended to the conjunctiva, and has rendered the eye irritable, so that free lachrymation takes place, changes occur in several particulars which it is important to notice. The sore extends, still surrounded and bordered by the elevated and hardened skin, which has a white and irregularly tuberculated appearance; the surface of the sore is still pale and languid, and the progress of ulceration is slow; but it is now painful and uneasy, the pain being described as a burning or aching sensation, not a pain of an acute, darting, or throbbing character, and the sore discharges a thin and somewhat offensive and irritating fluid. The surface of the sore is changed in its appearance by the irritation of the tears,—its own peculiar characters are, at this stage, greatly modified by that and other causes.

---

* I have since had reason to know that the development of the disease to the extent mentioned above, may occupy seven or eight years.

" At this period the progress of the ulceration becomes more rapid; a great part of the eye-lid is eventually destroyed; the eye-ball is isolated, in a great measure, from surrounding parts, (for the sclerotica never accepts this peculiar morbid action, but the eye-ball generally sloughs and collapses from the destruction of neighbouring structures,) and the patient dies, worn out by the constant and exhausting irritation the disease produces. Prior to the occurrence of this fatal event, the sore becomes more irritable and painful, chiefly from the lodgement of its own secretions and from the flow of tears upon it. The countenance also undergoes a particular change, the complexion becomes sallow or slightly cerulean, the face becomes pinched and acquires a character of exhaustion such as we see produced by the endurance of unceasing gnawing pain. The constitutional symptoms are those of irritability and exhaustion.

" I have not observed that the glands in the neighbourhood of the disease have been at all enlarged or in any way diseased; I do not deny that such enlargement and disease may occur in them in connexion with, or as a consequence of, this peculiar form of ulceration, but I have certainly not observed any such change in the glandular structures in the course of my observation.

" Now, with respect to the period during which this disease may continue, that will materially depend on the constitutional condition of the patient. I have known a person live for more than twelve years after the disease has been first noticed as a small white pimple."*

*Diagnosis.*—There are three diseases of the eye-lids with which this peculiar form of ulceration may possibly be confounded. The first of these is what is termed *lupus* or *noli me tangere;* the second is *syphilitic ulceration of the eye-lid*; the third is *cancerous ulceration of the palpebra.*

In lupus, the tubercles or elevations of the cutis, are of greater size, they are not so close together, nor so pale, neither do they affect a circular arrangement. Lupus is a more painful disease, it is attended with more inflammation and discolouration of the skin, and its progress is more rapid.

Syphilitic ulceration of the eye-lid commences *in* the palpebral conjunctiva, or *at* the tarsal margin, it is rapid in its progress, and is attended with no definite and manifest stage of induration. It generally occurs in young persons, is sometimes attended with eruptions on the skin, and other secondary symptoms, and is almost always cured or very distinctly influenced by the administration of mercury. This peculiar form of ulceration of the eye-lids is, on the other hand, always observed to commence *near to* the tarsal margin, it is extremely slow in its progress, and may remain many years in a state of induration before it passes into ulceration. It occurs almost altogether in persons advanced in life, and is invariably rendered worse by the use of mercury.

Cancer of the eye-lid, much more nearly resembles the form of disease under discussion, than either of the preceding affections. In cancer of the eye-lid, the *degree of induration* is more considerable, and the *quantity of indurated matter* is much greater. The skin is at first moveable upon the indurated mass; it soon becomes discoloured, the veins in its neighbourhood are enlarged and varicose; it quickly becomes adherent to the infrajacent mass of induration, it ulcerates, and obtains as its margin, an elevated ridge of reddish skin, which is not very symmetrically nodulated. The pain is severe and distinctly lancinating; the progress pretty rapid; the implication of the constitution distinctly marked by the appearance of the countenance and by the enlargement of the glands in front of the ear and in the neck. The ulceration is deep, and its discharge very irritating and offensive. It would appear that *cancer of the eye-lid* was more a disease developed in the cellular membrane, and this *peculiar ulceration* an affection of the skin. The small, white, hard, and painless pimple, which exists, until a second and third form, in a small cluster—affecting a circular arrangement—and which very gradually increase in size and number for many years before they ulcerate, is quite different from the larger masses of indurated cellular membrane which exist in true scirrhus; and besides the characters of the ulceration are very distinct: in cancer, it is for the most part deep and florid, or even livid; in the affection I am discussing, it is pale, superficial, and very slightly glazed, and has, for its margin, not a sharp and ragged, but a rounded, and regularly nodulated margin, as though a small white pimple bordered the ulceration at regular intervals. Finally, the *peculiar ulceration* does not affect the absorbent glands as cancer does, it is not attended with great, and certainly not with lancinating pain, its progress is very much slower, and is still further retarded by the adoption of proper remedial measures—so that a person observing the disease for the first time at fifty, may be kept in a moderate state of health, as far as this ulceration is concerned, until the goodly age of "three score and ten."*

---

* I have known the disease make scarcely an appreciable advance in the course of even four years, in consequence, as I think, of the employment of the means I shall presently point out.

*Causes.*—I can give no account of its causes. It has taken place under my own observation in individuals so differently circumstanced in every respect, that I am totally unable to mention any occurrence as the probable cause of the affection. Nearly all the persons I have seen so affected, have been advanced in life, have not been subject to ophthalmic inflammation, have received no important injury to the eyes, nor employed them in a manner calculated to produce any such serious disease. I have seen the complaint five times in females, and on eight occasions in old or middle-aged men.

*Treatment.*—It is my usual plan to recommend the occasional application of leeches around the sore, to dress it with a solution of the chloruret of soda, or with the common black-wash, and to recommend the patient to take the carbonate of iron in pretty large doses. I have tried stimulating and escharotic substances, I have excised the diseased part, and have seen it removed by others, and am convinced that under the use of both these measures, the patient has neither lived so long, nor has he suffered so little pain, nor has the progress of the ulceration been so slow, as under the use of the mild plan of management I have just described. However, the details of the treatment will be explained in the following cases.

---

* I beg to refer the reader who may be desirous of comparing my account of "peculiar ulceration of the eye-lids," with the description of other diseases with which it is not, as I have endeavoured to show, identical, but which it may be considered to resemble, to the following works:—"Observations respecting an ulcer of peculiar character which attacks the eye-lids and other parts of the face," contained in the *Dublin Hospital Reports*, Vol. iv. page 232.—TRAVERS, on "Cancer of the eye-lids, and contents of the orbit," in the fifteenth volume of the *Medico-chirurgical Transactions*, page 234.—LAWRENCE's remarks on "cancer of the lower eye-lid," in his *Treatise on the Diseases of the Eye*, page 582.—Two cases of cancer of the eye-lid, treated by MR. WARDROP. *Lancet*, Vol. xii. page 12.—MACKENZIE's "Observations on cancer of the eye-lids" in his *Practical Treatise, &c.*, page 145.

CASE I.—*Peculiar ulceration of the eye-lid much retarded in its progress by the administration of the sulphate of quinine, and by the application of the chloruret of soda.*—Frances SPARKES, æt. 79, has an ulcer at the inner canthus of the left eye, possessing the following characters:—its edges are round, raised, indurated, and irregularly tuberculated; its surface foul and covered with a reddish discharge; occasionally it scabs over, and, on the removal of the scab, bleeds rather freely; in several parts it seems as though it had healed and again ulcerated; the skin has a knotted appearance, and presents an irregular surface wherever it has formed over a part formerly implicated in the disease. She states that it originated in a small, white, hard, and painless pimple, about eight years ago; that by scratching it she caused it to take on the character of a minute sore, discharging a bloody fluid, which, by concreting, formed a scab; this scab was occasionally removed, and caused much pain and slight hæmorrhage until the discharge again formed a similar covering. Sometimes it healed at one part, a peculiar cicatrix formed, which, on some future occasion, ulcerated; but during the whole time her health has been good, with the exception of the infirmities incidental to her age. She complains, however, of slight pain in the head, confusion of vision, and loss of appetite; the countenance is pale and sallow, and the pulse is somewhat irritable.

Constitutional treatment and various local applications were tried without success, the sore extending and becoming more painful, the surrounding conjunctiva and the lachrymal caruncle becoming very vascular, and assuming, what has been termed, a *pulpy* appearance.

A solution of chloruret of soda was now used, and its effect was, at first, so salutary that the patient expected a complete cure to be accomplished; but, although it caused the ulceration of the skin to heal, it did not prevent the extension of the disease in the conjunctiva, which became daily redder and softer, so as to *appear* quite *pulpy.* The sclerotic coat of the eye appeared healthy and unaffected with the morbid action.

This woman lived several years after the period when these notes were taken; and died about fourteen years from the commencement of the disease, from exhaustion consequent on continued irritation and pain. Prior to her death a great part of the eye-lids, towards the inner canthus, was destroyed; the globe was, in a great measure, separated from surrounding parts; it sloughed, and eventually collapsed; she then suffered from occasional hæmorrhage and severe pain, and the appearance of the ulceration was truly terrible. I believe her life was much prolonged by the internal administration of quinine and the external application of the chloruret of soda.

Case ii.—*Peculiar ulceration of the eye-lid arrested in its progress and partially healed by the administration of the carbonate of iron, and by the application of the black wash to the surface of the sore.*—Thomas Sprawson, ætat. 59, a builder, has an ulcer about as large as a sixpence at the inner canthus of the left eye.

*Characters of the sore.*—The surface of the ulceration is a little depressed and rather pale and smooth; its edges are slightly raised, indurated, and irregularly tuberculated; it discharges a thin watery fluid, which slightly irritates the surrounding skin; the sore is scarcely at all painful, but the contraction of the surrounding parts has drawn down the upper lid.

This patient is healthy in appearance, and says he has enjoyed a good state of health all his life.

*History and progress.*—A little pimple appeared at the inner canthus, about three years ago; this was followed by two or three others, which arranged themselves in a somewhat circular manner, leaving a portion of healthy skin in the centre; this apparently healthy portion of skin ulcerated in the course of a few months, and obtained, as its margin, the tubercular elevation of the cutis which I have just described. Since that period the ulceration has been extending, and has not appeared to be checked—influenced in the slightest degree—by any measures his medical attendants have employed for his relief.

When I first saw this gentleman I placed him upon a regulated system of diet, and directed him to take, three times a day, four scruples of the carbonate of iron, and a few grains of blue pill and conium in the evening, and to apply to the sore a little black wash prepared with a large quantity of calomel. At his second visit, the ulceration had completely healed, and his health had much improved, and this state of amendment continued for some time afterwards.

In the course of a few weeks the part began to be fretful, and, at length, ulcerated at one small point; I directed him to apply the yellow wash to this speck of ulceration, which caused it to spread; he then tried again the black wash with the same agreeable result as at first, so that the good effects of this application were perfectly decisive. When I last saw him the point of ulceration was extremely minute, a few little white elevations of the cutis remained, and the skin has a delicate pale-red appearance, where it had formerly been ulcerated, and is not at all wrinkled or furrowed. I have not seen this gentleman for the last twelve months, so that I am led to conclude his disease is stationary, as he promised to call upon me if it again increased.

Case iii.—*Peculiar ulceration of the eye-lid kept nearly stationary by the administration of the carbonate of iron, and the external application of black wash.*—Mary Field, æt 74, has suffered, for three years, from a little ulceration of the lower eye-lid, near the tarsal margin. She says, that a number of small pimples existed for at least five years, in the situation of the present sore, and "before it became a wound." She is a tolerably healthy person, of a clear ruddy complexion, has occupied herself for many years past in the performance of her ordinary household duties, and has enjoyed excellent health nearly the whole of her life.

*Characters of the sore.*—Towards the inner canthus, and nearly at the tarsal margin, there is a sore, nearly as large as a sixpence, but not exactly of a circular figure—it is rather oblong. The surface of the sore is pale, and slightly glazed, and it is quite superficial. The edges of the sore are rather rounded, slightly indurated, and regularly tuberculated—just as though a string of minute white beads, corresponding to the magnitude of the ulcer, and arranged in a nearly circular figure, were inserted beneath the skin, around the edge of the sore. There is a little discharge, of a pale watery character, from the wound, which, however, scarcely at all irritates the surrounding skin.

There has been no attempt at reparation; the progress of the ulceration is extremely slow, and is attended with scarcely any pain. The absorbent glands in the neighbourhood of the sore, are not at all enlarged. After having tried various remedies for her relief, she found nothing so useful in preventing the extension of the mischief as the black wash, which she applied to the part twice a day by means of a little lint. She also took the carbonate of iron in pretty large doses, two or three times a day, every alternate month.

"This woman died, from an affection of the chest, six years after I had first an opportunity of observing her case; and I am scarcely prepared to say that the ulceration had extended during that period in any appreciable degree—at all events, if it had extended, it must have been very slightly, as the fact of such extension was doubtful to my mind, although I had watched her case with great care, in particular reference to this circumstance. I may mention, however, that the sore invariably increased, if she neglected to dress it, or omitted, for any considerable length of time, to take her medicine. It may also be mentioned that the surface of the ulcer always looked worse, if her health was much disturbed, if she over-exerted herself, as in washing or brewing, or if, to use her own words, she "took less care of herself than she ought to do."

## SECTION VII.—TUMOURS WITHIN AND UPON THE EYE-LIDS.

The eye-lids are very frequently the seat of tumours of various kinds, which, although they do not generally, and by proper management, lead to any serious result, occasion a good deal of inconvenience, and constitute an unpleasant personal blemish. The inconvenience to which I particularly allude, is, an uncomfortable feeling of weight of the eye-lid, an irritable state of the eye, or a disposition on the part of that organ, to become inflamed from a slight and trifling cause—a cause, which, in the healthy condition of the eye and its appendages, would be wholly inadequate to produce such a result.

As tumours very frequently form in the eye-lid, as they vary much in their characters, and as the means employed for their cure or relief are very different, I have thought it adviseable to describe them somewhat minutely. I am satisfied that the mode of managing them is sometimes very defective, and that patients are now and then disfigured and rendered very uncomfortable in consequence of the extirpation of a very trifling tumour in the eyelid, the removal of which ought not (and would not if judiciously accomplished) to have led to such an injurious result.

SOLID TUMOUR INTIMATELY CONNECTED WITH THE SKIN.—This form of tumour may occur at any period of life, and more commonly results from local injury, particularly where that injury has induced ecchymosis of the lid. It does not occasion any severe pain, rarely acquires a large size, and is only inconvenient by increasing the weight of the eye-lid. The tumour is generally smooth upon its surface, and may be moved, in conjunction with the skin, upon the tarsal cartilage, but the integument cannot be moved upon its surface. If an attempt be made to remove it, it is found to be blended with the cutaneous texture; and it is also found to be impossible to take the whole of it away without also removing a portion of the skin. It is not desirable, therefore, to attempt the extirpation of such tumours unless they have acquired a considerable size, and produce great inconvenience and inflammation by their magnitude, and have resisted the adoption of other measures for their removal. I have generally effected their absorption, by recommending the persevering and careful infriction of either the strong mercurial, or the hydriodate of potash ointment.

TUMOURS ARISING FROM THE TARSAL CARTILAGE.—Morbid growths may proceed from the tarsal cartilage, either on its cutaneous or mucous aspect, but they very rarely indeed originate in the latter situation. The tumours which arise from the tarsal cartilage, are of various kinds, but they are generally somewhat firm at their origin; in their progress, their interior softens, and their exterior is covered with condensed cellular membrane, except at that part where they arise from, or become attached to, the tarsal cartilage. When these tumours are of small size, the state of things is such as I have now represented, that is, the cellular membrane is condensed around their exterior, their interior is soft and perhaps fluid, and the tarsal cartilage (presuming the tumour to arise from its cutaneous aspect,) is scarcely at all thinned by its pressure; but the skin of the eye-lid is obviously projected, so that, when the palpebra is drawn over the globe of the eye, there is a definite and distinct prominence pointing out the site, and indicating the magnitude, of the tumour; the skin is also distinctly and freely moveable upon its surface, but the tumour itself cannot be moved upon the tarsal cartilage. If this tumour increase in size, the external prominence will be augmented, and on everting the lid, it will be seen that the cartilage is absorbed, and that there is a circular mark or ridge indicating the extent of the base of the tumour, and also pointing out the extent to which the cartilage has been absorbed, and, in fact, there is nothing in the space comprehended within this circular ridge to prevent the contents of the tumour from being in actual contact with the globe, but the mucous lining of the eye-lid.

When a tumour arises from the tarsal cartilage on its mucous aspect, it is always rendered evident by symptoms so well marked, that it is not possible to mistake it, nor to overlook the actual site of the morbid production.

I have pointed out the origin, and traced the progress, of the common tarsal tumour, and have represented the symptoms by which it is distinguished from other tumours of the lids, up to that stage when the cartilage is absorbed, and the attenuated and florid mucous membrane alone forms its posterior boundary; and unless remedial measures be employed at this stage, the mucous membrane will also become removed by absorption, and the fluid part of the contents of the tumour will be discharged, but the solid portion will remain, and there will also remain a ragged ulcerated surface, which will occasion severe and prolonged irritation. It is therefore evident that this state of things ought to be prevented from taking place, by the removal of the tumour before it has led to the destruction of the palpebral conjunctiva.

*Treatment.*—When these tumours are small, it is adviseable to direct the patient to rub upon their surface for ten minutes, once or twice a-day, a small quantity either of the strong mercurial, or the hydriodate of potash ointment, and to prescribe a little aperient medicine. But, if these means fail, if the tumour increase in size, if it have acquired a considerable magnitude, and if, on everting the lid, it is found that the tarsal cartilage is absorbed, it would be improper to continue the friction, and the tumour ought to be removed by an operation, without further delay. After having stated the pathological condition of parts under these circumstances—after having stated that the skin is healthy and may be freely moved upon the tumour, and that the tarsal cartilage is absorbed, and that the attenuated mucous lining of the lid constitutes the posterior boundary of the tumour—it is evident that it ought not to be removed by an incision of the skin; if an attempt be made to remove such a tumour externally, the skin, the fibres of the orbicularis muscle, and the mucous lining of the eye-lid (which constitutes the posterior boundary of the tumour), must all be divided, and, of necessity, an aperture formed in the lid throughout its entire texture; and the patient be consequently subjected to a needlessly painful and protracted operation, and to the infliction of an injury which may occasion much subsequent inconvenience, and, perhaps, deformity.

The mode of curing such tumours, which I have adopted in a vast number of cases, is as follows:—having directed an assistant to evert the lid very completely, I divide, in a direction parallel with the ciliary margin, that part of the mucous membrane which constitutes the posterior boundary of the tumour; and, if the contents of the tumour are solid, I make a second incision, so as to join the former one at each extremity, and to include a portion of the mucous membrane; and having grasped the portion of the palpebral conjunctiva, to which the tumour is attached, draw it gradually and gently outwards; but, if any adhesions to the surrounding cellular membrane exist, a little dissection may be necessary; the tumour may not, under such circumstances, be readily withdrawn from the submuscular or the subcutaneous cellular membrane in which it may be situated, without the aid of the scalpel. But, if the contents of the swelling are partly solid and partly fluid, I merely make an incision, quite through the palpebral conjunctiva, throughout the entire length of the tumour; and, having waited until it has ceased to discharge, I introduce a probe through the opening in the mucous membrane, and move it about freely so as to break down its entire texture as completely as possible; and I have only in recollection one instance in which this method of treatment has failed to effect a perfect cure.

PAINFUL SUBCUTANEOUS TUMOUR.—I have noticed a small tumour situated in the subcutaneous cellular membrane, which has produced an extreme degree of pain. The skin covering these enlargements has always been moveable, and has possessed a bluish appearance; the tumour itself has been small and round, and excessively hard, and has been perfectly moveable upon the tarsal cartilage. I had an opportunity of examining one of these tumours, after the death of the patient in whom it occurred; it did not appear to have any nervous connexions adequate to explain the suffering it produced—no *visible* nervous twigs were connected with it. It was composed of a hard substance of a greyish texture, interspered with blue lines or streaks; the cellular membrane was somewhat condensed around its exterior, but did not envelope it in that intimate manner, which would justify me in saying that it constituted a cist, in the ordinary acceptation of that term. In other instances in which I have removed a tumour of this description from the eyelid, the pain, which was previously most tormenting, immediately ceased, and did not return, nor were any fresh growths produced. I may mention that the pain was not equally severe during the whole period of the existence of these tumours, although it was never entirely absent; it seemed to vary with the state of the individual's health, and to be increased and modified by those circumstances which exercise an influence over other local maladies. My friend, MR. WILCOX, assisted me to remove a tumour of this description a few weeks ago, in the person of a little girl (— TAYLOR) residing in Bull Street. The tumour was situated at the outer canthus, it was small, and often dreadfully painful. The removal of the part developed no circumstances which satisfactorily explained the suffering it formerly occasioned.

If a person were unwilling to permit the extirpation of such a tumour, I should advise that the strong mercurial ointment, blended with opium, be rubbed into it, two or three times a-day.

**Common adipose tumour.**—This variety of tumour consists of a mere secretion of fat, of a pale yellow colour, surrounded by a delicate cist. It is not granular and hard, as adipose productions in other situations sometimes are, but it is soft, and very frequently lobulated, the small portions constituting the lobuli being enveloped in a fine cellular cist, which are, eventually, all surrounded by a larger cist. This tumour is generally found at some distance from the ciliary margin of the eye-lid, in the loose cellular texture which exists in such abundance immediately behind the orbitar margin of the tarsal cartilage. A tumour of this description is not by any means richly organized, and, as far as I can discover, does not arise from local injury. It may acquire a considerable size, and is distinguished chiefly by the doughy inelastic sensation it communicates on pressure. It is always moveable in the cellular membrane in which is was originally deposited, and, unless it has acquired a very large size, it may be freely moved upon the tarsal cartilage, and the skin may be moved upon it. It is not necessarily attended with pain, either at its origin or during its progress; but it may give rise to a painful degree of uneasiness, when very large, by the tension of the skin, and the pressure upon the tarsal cartilage and upon the eye-ball, it may then produce.

*Treatment.*—I have known these tumours absorbed by the persevering use of the strong mercurial, or the hydriodate of potash ointment; or, by simply rubbing the skin upon their surface, with a smooth hard body, such as a plain gold ring. But, if they are large, if they have resisted these measures, and particularly if the skin has become inflamed, they had better be at once removed by an operation.

*Operation.*—These tumours should be removed externally, (for they always form on the cutaneous aspect of the tarsal cartilage,) and this may be accomplished without the slightest difficulty, by merely stretching the lid upon the globe of the eye, and steadying the tumour, whilst an incision is made upon its most prominent part; the mere division of the skin is generally all the cutting that is necessary, for if when the skin is completely divided over the whole extent of the tumour, the morbid product be grasped by a hooked forceps, it may be withdrawn from its situation with the utmost facility. In removing these, and all tumours of the eye-lids from without, it is desirable to make the incision in the loose part of the integument where the skin of the eye-lid naturally forms a fold or wrinkle, if the situation of the tumour will admit of its being removed at this part; and, of course, if no contraindicating circumstances exist, the incision should be made in a direction parallel with the tarsal margin—in the course of the fibres of the skin and the orbicularis palpebrarum.

COMMON STEATOMATOUS TUMOUR.—These tumours are situated in the subcutaneous cellular membrane; they do not arise from the tarsal cartilage, nor have I ever observed them between this cartilage and the mucous membrane; they seldom acquire any considerable degree of magnitude. Their structure is firm and solid, sometimes even semi-cartilaginous, the central part being rather less consistent, and they are enveloped in a cist, composed of the surrounding, firmly-condensed, cellular membrane. There is seldom more than one of them present at the same time, which is most commonly situated in the cellular membrane, behind that portion of the tarsal cartilage which is most distant from the ciliary margin of the eye-lid. I have seen them, in other instances, in the cellular tissue beneath the skin, and anterior to the orbicularis muscle; and again, in the cellular membrane between the tarsal cartilage and the fibres of the orbicularis muscle.

*Treatment.*—If the means suggested for promoting the absorption of the adipose tumour of the eye-lid fail to effect the absorption of these tumours, and particularly if the skin has become inflamed, and they are evidently less moveable upon the tarsal cartilage than they were at an earlier period of their existence, they ought to be removed by an operation, performed in the same way as was recommended for the excision of the adipose tumour.

TUMOUR ARISING FROM THE ENLARGEMENT OF A CUTANEOUS FOLLICLE.—This variety of tumour of the eye-lid is very commonly observed, and is first noticed as a small prominence generally of a somewhat oval figure; as it increases in size, a minute pin-hole aperture forms in its centre, through which a white concrete substance may be expressed. If a bristle be passed through this aperture, it enters the cist containing the concreted substance.

Many of these tumours often exist at the same time, particularly in children; there may be five or six of them in various parts of the palpebræ, and in other parts of the face. They form in the subcutaneous cellular membrane, and their cist is generally fine and delicate, possessing a very slight degree of vascularity and having scarcely any adhesions to surrounding parts, so that they admit of removal in an entire state with the utmost facility. On examining these tumours, they are found to be composed of a fine bag of a white consistent substance, not of a homogeneous texture, but slightly fibrous and granular in appearance, evincing, however, no traces of organization; in short, they appear to be a mere secretion—the secretion of the enlarged cutaneous follicle. Sometimes the cist will be much thicker than has been just represented, but it does not usually acquire any considerable degree of density; it does not acquire that thick strong character which the cists of tumours, in other situations, are known to possess.

If these tumours are allowed to continue, the skin will first inflame, and then ulcerate; the surface of the enlargement will become exposed, and will present a rough fibrous appearance, and will eventually slough, or the discharge from its surface may become dry and be gradually projected by a new quantity of the dried secretion, which may thus acquire a long pointed figure, and give the subject of the affection a very peculiar appearance. I have had numbers of children brought to me for the purpose of having these "little horns" removed.

*Treatment.*—These tumours are best removed from without, and I am in the habit of making an elliptical incision, so as to include the small portion of integument in which the aperture leading to the interior of the swelling exists; and having done this, I grasp the strip of skin connected with the tumour, with a forceps, and, by the aid of gentle traction, remove it, with its cist, from its cellular nidus.

Various encisted tumours.—Encisted tumours, containing a fluid of various kinds, occasionally form in the eye-lids, and they may arise at, and from, any part of them. They may exist immediately beneath the skin, and that is their more ordinary seat; they may arise within the cellular membrane intervening between the tarsal cartilage and the orbicularis muscle; from the tarsal cartilage itself, or between it and the mucous membrane of the eye-lid; and lastly, hairs may grow from the surface of the cists, or they may be found loose in their interior, and, indeed, very curious substances have been represented as having been occasionally found in the cavity of these cists. Sometimes the hairs which grew from the surface of the cist become detached from it at a certain period of their development. In three cases in which I have removed a tumour situated towards the external canthus of the eye, immediately beneath the supercilium, the cist in each of them contained a small quantity of thin yellowish fluid, like a very weak solution of honey, a few hairs only remained attached to the surface of the cist, which was soft and almost flocculent, somewhat thick and of a greyish colour, and a ball of hairs, composed of an immense number of single hairs, was floating in the fluid contents of the cists. When I take into account this fact in connexion with the pathological condition of the cist to which I have just referred—that is, its greyish, thickened, and softened state—I am inclined to refer the detachment of the hairs to some morbid state of the internal surface of the diseased production; or, in other words, I think it very probable that the hairs found in each of these cists, which originally grew from, and were attached to, their surface, were thrown off and detached in consequence of some subsequently occurring change in the state of the cists which produced them. In other instances where hairs have been found adherent to the surface of cists in many respects similar to those just mentioned, that surface has been of a firmer, denser texture; it has not been by any means so loose and soft, and, I might almost say, so flocculent. How close may be the analogy between that morbid process, by means of which hairs are detached from other surfaces with which they were originally connected, and from which they naturally grew, and that existing between the diseased change occurring in a surface, not originally constituting a part of the system, I do not venture to determine. The usual seat of encisted tumours of the eye-lid, when they contain hairs, is near to the eye-brow; and I have frequently found them situated towards the external canthus. The hairs they contain are generally short, and not remarkably thin; they are of the same colour, and generally possess the same curve, as those constituting the eye-lashes of the individual in whom this morbid production occurs.

Now, such tumours will sometimes become adherent to the periosteum of the orbit; and I mention this fact particularly, because it has appeared to me, from the opportunity of witnessing a great number of such cases, that this adhesion very frequently results from the continuance and increase of the tumour; when they are removed soon after their formation, such adhesions will be rarely found to exist, but they are equally rarely absent when their removal is delayed. Of course I am only stating the general rule, for it cannot be denied that, in some such cases, the cists of these tumours arise primarily from, or, at least, are from the first attached to, the orbital periosteum.

*Operation.*—I shall presume that the usual means of curing a tumour of this description, without having recourse to a surgical operation, have been tried; that they have been fruitlessly employed; and that its removal by an operation is deemed necessary. Some surgeons prefer to puncture the cist, and discharge its contents; others again lay open the cist throughout its entire extent; but as these measures generally fail to effect a radical cure, as they are merely palliative in their principle, it is in very many cases requisite to have recourse to the operation of extirpation of the cist, a measure I always adopt at once, without incurring the risk of inflaming the cist, and, consequently, inducing the rapid growth of the tumour by puncturing or lacerating it; for, it will be remembered, that such cists do not readily take on the adhesive process when inflamed, but generally lead to an increase of that fluid which they previously contained.

When they arise anterior to the tarsal cartilage, to which they have formed no adhesions, they are most easily removed by an incision in the integument of the eye-lids, which should also penetrate the cist and discharge its contents; the sides of the incision should be then pressed together, and the cist everted, and gradually withdrawn, which may generally be accomplished without any further dissection. Some surgeons prefer to remove them in an entire state; but, even admitting that this can be effected, the operation is much more tedious, much more painful, and, in nine cases out of ten, the cist will be punctured, and the operator will be finally compelled to remove the tumour as though an incision had been at once made into the cist. When these tumours arise from the tarsal cartilage, or become attached to it during their progressive development, the posterior part of the cist is so intimately connected with that cartilage, that it cannot be dissected from it, without making an opening in, or otherwise injuring it; and I may state, with the utmost confidence, that if the small portion of the cist so attached, be left behind, it will not give rise to any fresh accumulation of fluid, and the parts will heal, just as though it had been most perfectly and completely removed. However, the very slight risk which exists of the reproduction of the tumour, is not to be compared to the serious injury which may follow the formation of a large and irregular aperture in the tarsal cartilage, which is so generally made during any persevering attempt to dissect the posterior part of a cist which has become adherent to it, from its surface.

I am unwilling to close this account of tumours of the eye-lids without directing especial attention to the fact, that many small and trivial tumours, may become consequential, merely by increasing in size, and producing the attenuation and absorption of the tarsal cartilage, by which a great tendency to ectropium, or entropium, is always communicated.*

## SECTION VIII.—WARTS UPON THE EYE-LIDS.—PHLYCTENULA.—MILIUM.

WARTS.—Warts may form at any part of the eye-lids, but they generally grow from its cilary margin. They are easily cured, either by excision, by the use of caustic,† or by the application of a fine ligature. When they are large, with an extensive base, the use of caustic, or the operation of excision, is preferable; but when they are small in size, and particularly when they arise by a slender pedicle, the application of a fine hair or thin ligature to the base of the pedicle, is to be preferred. These verrucæ are most commonly observed at that part of the eye-lid where the cutaneous becomes gradually changed into a mucous surface; but I have not remarked that they are especially prone to follow either any particular form of inflammation, or of disease, either of the eye or its appendages; or to succeed to any particular kind of application which may have been used for the removal of some morbid affection of the eye. The characters of these warts upon the eye-lids, are, precisely, the same as those of verrucæ in other situations.

---

* The diseases of the tarsal cartilages will be again referred to when treating of ectropium and entropium, when I shall take occasion to point out the enlargements and other alterations to which they are liable. I have not, on this account, referred to them among the "tumours of the eye-lids."

† The application of caustic would, of course, be improper, if they form quite at the tasal margin, on account of the risk of inflaming the eye.

Phlyctenula.—Small tumours resembling a transparent vesicle and containing a limpid fluid, sometimes form at the margin of the eye-lid, and they are most commonly observed towards the inner canthus. In some instances, the appearance of phlyctenula is produced by the dilatation of the lachrymal canaliculus. These vesicular productions constitute a slight personal blemish, and, in some instances, produce a good deal of uneasiness, so that the eye is kept in a constant state of irritation, and, on these accounts, we are often required to remove them; and this is very easily accomplished. We have only to snip them away with a pair of curved scissors;—if they are removed in this manner, and the small cavity produced by their removal be afterwards touched with a piece of lunar caustic, worked to a very fine point, they are effectually cured, and do not afterwards occasion any inconvenience. I have, on many occasions, seen vesicular bodies developed in the cellular texture, beneath the sclerotic conjunctiva. Sometimes they are firmly attached to the sclerotica, but they are more commonly moveable upon it. They may acquire a considerable size, and possess a fine cist, in addition to the covering they derive from the sclerotica. Sometimes they form in clusters—several of them of variable size being collected together—and then it usually happens, that two or more small ones are attached to a larger one. I have cansed them to shrink and disappear by the use of zinc or alum lotion, or by dropping into the eye every evening a weak solution (a grain and a half to an ounce of distilled water) of the nitrate of silver."*

---

[*] Case.—Mrs. Hobday, æt 57, residing in Brook-street, has a watery swelling at the inner side of the right eye, very near to the corneo-sclerotic junction. It does not occasion any pain, and scarcely

**Milium.**—Small white tumours, containing a quantity of consistent matter, like suet, sometimes form at the tarsal margins, in old and middle-aged persons. They seldom become larger than a pea, and having attained that size, they usually remain stationary. They occasion no pain, and little inconvenience, and may be cured, simply by opening them pretty freely, and expressing their contents.

### SECTION IX.—HORDEOLUM.

Hordeolum is a small, hard, painful tumour, situated at the ciliary margin of the eye-lid. It is at first red, slightly prominent, and extremely tender, and it becomes exquisitely painful when it has acquired a certain magnitude, unless it suppurates, which is always accomplished very slowly. Prior to the occurrence of suppuration, the little tumour is exceedingly hard, but as soon as that process commences it becomes soft at the suppurated point, the pain is diminished, and the formation of matter is evinced by the existence of a white spot in the centre of the hordeolum. The suppuration is generally very slight and incomplete, so that considerable induration remains for some time after the matter has been discharged. Instead,

---

any inconvenience; the eye is not at all inflamed. The swelling has been noticed a long time.

*Characters of the vesicular enlargement.*—The swelling is rather of an oblong shape, and consists of one vesicle, about the size of a large pin's head, attached to another equal in volume to a pea. The swelling feels very tight, and, when pressed with a probe, is found to be only slightly moveable upon the sclerotica. It is nearly transparent, and appears to be covered by the attenuated conjunctiva, and also by a fine cist in which the fluid is contained. The tumour does not disappear when compressed.

This swelling was so much reduced by the use of the zinc lotion, that she refused to let me puncture it.—I have referred to a similar case, at page 52, Vol. I.

however, of suppurating when it has arrived at its greatest degree of development, it may remain as a hard, slightly painful pimple, and this state of things has been termed *grando*, on account of the form, the size, and the hardness of the little tumour, so designated. Hordeolum appears to be nothing more than inflammation of the cellular membrane at the tarsal margin, with inflammation and obstruction of one or more of the Meibomean follicles, which inflammation is rendered slow in its progress, and painful, in consequence of the firmness and extreme sensibility of the parts by which it is surrounded.

*Treatment.*—The treatment of hordeolum in its early and inflammatory stage, consists in the application of cooling lotions to the part, and the use of active purgatives. If, however, the pain and inflammation continue, without evincing any disposition to subside, or if suppuration has commenced, the eye should be frequently bathed with tepid water, or fomented with some mild and warm vegetable decoction, and a bread and milk poultice, enclosed in a fine linen bag, should be applied to it during the night. The matter should be discharged at an early period after its formation, and the same warm applications and poultices recommended to be used prior to the occurrence of suppuration, should be continued after it has taken place, until the hordeolum subsides into a minute indurated pimple, when the use of the citrine ointment will be sufficient to complete the cure.

Some persons, and especially those of a scrofulous habit, or those who are often affected with chronic ophthalmia and tinea, are very prone to the formation of hordeolum; and it will sometimes happen that several of them will form at the same time, and, in such cases, it will be found that there is something wrong in the health, which requires attention. A course of purgative medicine, attention to diet, and abstaining from using the eyes much in the observance of objects requiring minute and attentive vision, and especially by candle-light, will generally cure this tendency to the formation of hordeolum. I know that many surgeons consider the formation of hordeolum to be always a direct consequence of a faulty condition of the general health, but we must admit that, whatever may be their cause, their progress is materially influenced by various circumstances connected with the state of the part in which they occur; for, in those instances where several of them appear at, or nearly at, the same time, or, in those other cases where one or more appear on the *subsidence* of prior ones, their progress is often very different; they do not advance to their complete development with equal celerity, their mode of termination is frequently dissimilar, and their magnitude is not by any means precisely the same. It must, therefore, be admitted, that, in the consideration of these inflammatory productions, the local aptitude and condition of the part, as well as the constitutional state of the patient must be taken into account, in estimating the cause of their appearance, in viewing the history of their development and mode of termination, and in deciding upon the plan of treatment it may be necessary to adopt for their cure. The hordeolum which occurs and relapses so frequently in scrofulous children, is readily cured by the administration of the sulphate of quina, and by rubbing the hordeolum, when neither much inflamed, nor in a state of suppuration, with a plain gold ring, or with any hard body, by the agency of which friction may be conveniently applied to its surface.*

* Many of the old writers give a very curious account of the causes and treatment of hordeolum. BANISTER mentions, on the authority of INGRASSIAS, among its causes, (which forcibly proves their acquaint-

## SECTION X.—NÆVUS MATERNUS AND VARICOSE ANEURISM OF THE EYE-LIDS.

NÆVUS MATERNUS.—Nævi sometimes form upon the eye-lids, and they are of two kinds, arterial and venous; by which terms, however, I do not intend to imply, that either the arterial or venous nævus, consists entirely of venous, or of arterial blood, but that the one or other of them exists in a predominating quantity. The arterial nævus is distinguished from the venous, by its greater degree of elasticity, its higher temperature, and its bright scarlet colour, and generally, also, by the greater rapidity of its growth, and the speed with which it returns to its original size, when the vessels of the tumour have been emptied by compressing its surface.

When the nævus is rapidly increasing in size, it would be adviseable to attempt its cure, even although the child in whom it exists is very young, for, although it is not desirable to operate upon infants at a very early period after birth, yet, when the tumour is manifestly much increasing, I think it a lesser evil to incur the risk connected with the

---

ance with the pain with which it is attended) "that women, when they haue conceiued, are naturally subiect to longing, and desiring of many things, which if, perhaps, they be in the power and possession of any, who will not giue it them at their request, they curse and threaten him with hordeolum, *which commonly befalleth them*."—Among the means of curing hordeolum he mentions, "the use of the blood of a pigeon or turtle," the "blood of rauenous birds, which issueth from them after the head is pulled off," the use of "the yolke of an egge and hony mingled together;" and he states from ÆTIUS, that "if the gristle (tarsal cartilage) be corrupted within, hee turneth the eye-lidde and scrapeth away so much of the gristle as is decayed and defiled." Section iv. chapter xiv.—ST. YVES speaks of three kinds of tumours of the eye-lids, all of which appear to resemble hordeolum in its various stages, namely, the "barley-corn," the "hail-stone," and the "gravel-stone of the eye-lids." His mode of treating the disease is scarcely in advance of that just quoted from BANISTER.

performance of an operation in very early life, than to permit the considerable extension of the disease. I think a surgeon should prefer to meet the increased, and sometimes even great hazard, associated with the performance of an operation upon children of very tender age, rather than permit the tumour to acquire that size, which, even if he is eventually fortunate enough to effect a cure, can only be accomplished by the performance of a severe operation, which very often leaves behind considerable deformity, and is, by no means, unattended with danger. The operation I have to recommend, is not, by any means, of a formidable nature; it consists in the introduction of vaccine lymph, within the tumour, before the child has been vaccinated in the usual manner; and if the nævus be not very large, and if the constitution be susceptible of the vaccine influence, it is by far the most eligible plan of treatment hitherto discovered.

*Mode of vaccinating the nævus.*—Make a few scratches, or superficial incisions (the number of which will vary with the magnitude of the disease) upon the surface of the nævus, with the point of a lancet, at a short distance from each other, so as just to puncture the cutis, and, as soon as the bleeding has subsided, introduce the vaccine lymph, in the usual manner, into each of the punctures; then place a small bit of lint, soaked in the vaccine lymph, upon the surface of the nævus, and retain it there a few hours. In due time the vesicles appear, the part is covered with them, they coalesce, or appear to unite, into one scab, the tumour subsides, the scab is detached, and a slight mark or scar merely, is left behind. In vaccinating the nævus, it is important to make the scratches upon its surface at such intervals, as that the inflammation of one vesicle shall fully extend to that of another; they should, therefore, be made at regular distances, and the matter should not be introduced immediately after the incisions of the nævus are made, lest the discharge from them dilute too much the vaccine lymph. The adhesive inflammation, which now ensues, occludes the næval vessels and cells wholly or in part, and the tumour is, consequently, greatly diminished, or quite cured; or, the whole of it may slough from the extreme inflammation to which the vaccination may give rise. Sometimes the nævus is only partially cured by the vaccination; its size is reduced, but, from imperfect vaccination, or, from the occurrence of an insufficient degree of inflammation, it is not quite destroyed, and then the cure must be completed by other means. And this fact suggests the importance of performing the operation properly and effectually at first.*

2.—There is another method of curing nævus which acts pretty much in the same way and is entitled to every attention. It consists in making one or two small incisions into the nævus, and either introducing a minute portion of lunar caustic into the incisions, or touching them with that substance. The inflammation to which this process gives rise, or the sloughing it induces, causes either its diminution or its cure—the former, by occluding a portion of its vessels and cells, and the latter, by causing the death and detachment of its substance.

3.—The third method of curing these nævi consists in applying caustic to them. Cut an aperture in a thick piece of adhesive plaster, or in several pieces placed one upon the other, just large enough to admit the nævus; apply this plaster to the skin immediately around the nævus, so as to permit the næval growth to protrude through the opening in its centre, then take a little of the potassa fusa, and rub it upon the surface of the nævus until it appears discoloured. In the course of a few days, the part sloughs, the slough separates, and if the caustic have been properly applied, and the case adapted to its application, the nævus is very generally cured. In attempting the cure of nævus by this method, we must be careful to rub the caustic upon its surface so effectually as to destroy the vitality of the skin, and a certain quantity of the parts immediately beneath it, and produce a degree of inflammation adequate to insure the occlusion of the more deeply seated næval vessels. If the caustic be too liberally applied, or if the skin surrounding the base of the nævus be insufficiently protected, extensive sloughing and very unnecessary suffering may be produced, with an unpleasant scar, which may not only constitute a blemish, but may give rise to a very troublesome form of ectropium. Instead of applying the caustic in the way I have explained, some surgeons prefer to form it into a paste and place it upon the surface of the nævus, and retain it there for an interval varying with the strength of the caustic application.

---

* I have adopted this mode of curing nævus maternus rather extensively for the last ten years. My method of inserting the lymph, and my opinions of its usefulness and applicability, are pretty correctly described in the *Lancet* for August, 1827.

4.—Another method of curing this disease consists in applying a ligature around its base, and this is performed in various ways, but the following is my own method, and it answers the purpose very well. I thread a slightly curved needle with strong silk, and pass it quite beneath the nævus, puncturing the skin a little anterior to its base and bringing out its point at a short distance beyond it on the opposite side, then cutting out the needle, I tie the ligature very tightly upon each side, so as to strangulate its circulation, and, if necessary, tighten the ligatures every day, or apply another round its base in the furrow formed by the previously applied ligature. When the nævval tumour falls off there is a granulating surface left, which heals in the usual way, leaving behind a cicatrix corresponding in its size, or rather bearing a certain relation in its magnitude, to that of the nævus it succeeded. I prefer to employ a double ligature, and to tie one of the threads on each side of the nævus, rather than surround its base by a single ligature, for many reasons, and chiefly because the double ligature cannot slip off; because it stops the circulation more completely than the single ligature; and also because its influence extends deeper, for the single ligature often divides the nævus—causing its extremity to slough but leaving its base behind. There are several objections advanced against this method of treating nævus; it is said that the influence of the remedy does not extend sufficiently far, so that the disease is often reproduced; that it causes great pain; and that when the nævus is large, it may, by inducing ulceration before the blood-vessels are sufficiently occluded, give rise to dangerous hæmorrhage. It is certainly a painful method of curing nævus, and I have known the disease only partially cured by it, but I do not apprehend any danger from hæmorrhage, because nothing is more easy than to pass the needle so deeply as to make it enter the healthy structures beneath and beyond the parts actually diseased. Of course, according to the number of needles introduced the nævus may be divided into four or six portions so that each part may be surrounded by a ligature.

5.—Another method of curing nævus consists in passing two needles beneath the tumour (inserting them in, and bringing them out at, the healthy part of the skin) so as to cross each other at right angles immediately beneath the base of the tumour, and then to tie a quantity of thin but strong silk very firmly around them, so as to strangulate the næval circulation.

6.—The nævus may be excised, this is another means of cure much practised; indeed, there are some nævi in particular situations which can only be cured by excision. An incision should be made at a little distance from the base of the nævus, so as not to cut into its substance, and, with two sweeps of the knife, the surgeon should comprehend its circumference, and dissect a little beneath the level of the skin so as to detach its remaining connexions. If this operation be quickly performed, if the nævus be not punctured, and if proper measures be taken to repress any hæmorrhage which may arise during its performance, it is by no means necessarily a dangerous process, and has the advantage of effecting a very speedy and perfect cure.

7.—When the nævus is very large, and is obviously supported, in a great measure, by two or three considerable vessels, it is proposed either to tie these vessels singly, or the large artery supplying them with blood; for instance, if a nævus were situated upon the eye-lid, and were chiefly supported by a few large vessels, which were distinctly seen and felt to pulsate, and which also were superficially situated, it would be recommended by some surgeons to tie such vessels, with a view of diminishing the magnitude of the nævus, the cure of which might then be readily accomplished by the usual means; but, if such measures failed—if, after having applied a ligature to a few of the largest of its vessels, others should enlarge and perpetuate or increase its magnitude,—then the ligature of the carotid would be recommended, as a last resource.

8.—Abstracting the heat from, or lowering the temperature of, the surface of a nævus will contribute to accomplish its cure; and, for this purpose, it may be as well to try the effect of pounded ice, or of evaporating lotions, made with æther or spirits of wine. I have repeatedly tried them, but have never been able to get any patient under my care, who would properly apply them, and persevere sufficiently long in their use to give them a fair chance of being successful. The nævus will generally shrink upon the continued application of cold, but we can scarcely entertain any very sanguine expectation of accomplishing a cure by such measures alone when the nævus has acquired any considerable magnitude. This means of promoting the cure of nævus may, however, be advantageously associated with more decisive measures.

9.—Pressure has been strongly recommended, but whatever may be the advantages connected with its employment when situated in other parts, we cannot make use of any efficient amount of pressure when the nævus is placed upon the eye-lid.

10.—It has been suggested to pass a small seton needle through the texture of a nævus, into the eye of which a quantity of silk has been introduced, of a size adequate to fill up the opening made by the instrument to which it is attached. This prevents any hæmorrhage which might otherwise result from puncturing the substance of the nævus. This method of treating nævus is intended to produce its cure " by instalments,"—by causing a certain amount of inflammation in the neighbourhood of the silk. If the nævus is of large size a seton may be introduced through one side of its substance and allowed to remain there until it has caused as great a degree of inflammation as it is deemed desirable to excite: the insertion of a seton of this description may be repeated at intervals until the size of the nævus is so far reduced as to admit of the application of a ligature with the view of completing its cure. In performing this operation it is important to remember that the seton thread must be larger—must occupy a greater space—than the needle by the agency of which it is passed through the substance of the nævus.

11.—It has also been advised to attempt the cure of nævus by passing a small sharp needle with cutting edges through the skin a little anterior to the disease, and pushing it into the morbid structure in one direction, then withdrawing it, and re-introducing it through another part of the næval structure, but through the same cutaneous aperture.

I have thus laid before my readers in the briefest manner I could, compatibly with the due elucidation of the subject, the various measures which are, at the present time, most commonly practised for the cure of nævus maternus; but my limits will not permit me to enter upon an elaborate examination of their comparative advantages. The following are, however, the general conclusions I have deduced—respecting the circumstances which would justify and demand surgical interference, and the description of operative proceeding it would be most adviseable to adopt—from duly reflecting on my own practice, and observing that of various medical friends.

1.—When nævus of the eye-lid is rapidly increasing, it is adviseable to perform an operation for its cure without delay, whatever may be the age of the infant upon whom it is to be performed.

2.—When the nævus is not very large, and the child in whom it takes place has not been vaccinated, the inoculation of the nævus is by far the best operation for its cure, being less painful, less dangerous, and producing less subsequent deformity than any other operation hitherto discovered.

3.—If vaccination and the use of tartarized antimony ointment fail to effect a cure, I should recommend the application of a ligature, in one or other of the modes previously mentioned.*

---

* After having cured several nævi of the eye-lid, (which were not situated very near to its tarsal margin) by means of the ligature, I have, on five occasions, had to contend with a very troublesome form of inflammation of the eye, which has appeared to be owing to the

4.—When the nævus of the eye-lid is of very great size, ligature of its largest vessel, or of the trunk of the carotid, appears to be the most feasible, and, indeed, the only safe and adviseable method of treatment.

ANEURISM BY ANASTOMOSIS.—The lids may be the seat of aneurism by anastomosis. This disease is generally of considerable extent, and no remedies are sufficient for its cure, (except in very rare instances,) but ligature of one or more of its nutrient vessels, or of the common carotid. An attempt to cure the disease by lowering the temperature of the tumour may be made, and if this plan fail, as it generally will do, and the tumour continue to enlarge, it would be adviseable to proceed to the operation of tying the carotid artery without delay.*

additional quantity of blood suddenly thrown into the conjunctival vessels. I have related a case of this description in the third volume of the *Midland Reporter*, page 295.

* The characters and extent of the disease are well illustrated in the cases related by MR. WARDROP, in the ninth volume of the *Medico-chirurgical transactions*. Sir B. BRODIE has also given "an account of a case of aneurism by anastomosis of the forehead," which was of considerable size, in the fifteenth volume of the same work. A very dreadful case of aneurism by anastomosis of the scalp, occurred in the practice of DR. MUSSEY, on account of which both carotid arteries were secured, and it was eventually necessary to dissect the tumour from the scalp. The operator states that "more than an hour was occupied in carrying the knife around the base of the tumour, the whole operation being conducted with immediate reference to the saving of blood. Not more than an inch and a half of the scalp was divided at a time, and, immediately upon the division, firm compression was made upon each lip of the incision, while the vessels were secured by ligatures, more than forty of which were applied in going round the tumour. Notwithstanding, however, these precautions, it was estimated by all present, that blood to the amount nearly of two quarts was lost during the operation. The patient was faint, and continued very feeble for several hours. The naked pericranium, in extent equal to about *twenty-five square inches*, granulated kindly, and in eight weeks the wound was nearly healed." *American Journal of Medical Sciences*, for February, 1830.—The reader will find much useful information relative to *aneurism by anastomosis*, and the pathology and treatment of *nævus maternus*, in the various volumes of the *Medico-chirurgical transactions*, and also in MR. HODGSON's invaluable *Treatise on the diseases of arteries and veins*.

## SECTION XI.—ECTROPIUM.

In this disease the tarsal margin is everted, and the mucous membrane of the palpebra turned outwards—it is separated from the globe of the eye, in different degrees, according to the extent of the ectropium. This defect depends on various causes, and requires, therefore, different methods of treatment for its cure.

1.—The integument of the eye-lid may be shortened or rendered less capable of expansion—less elastic—than it is naturally, or, it may become adherent to the periosteum beneath. It may be shortened by loss of its substance, after the removal of tumours; by sloughing, or by ulceration. It may be rendered less capable of elongation than it ought to be, by various causes which indurate, consolidate, and render more rigid its texture, and by the substitution of a cicatrix for natural skin. And, it may become attached to the periosteum by inflammation or abscess in its neighbourhood, by deposition beneath it, or by disease of the bones. Sometimes the skin of the eye-lid becomes rough, scaly, and rigid—it loses its natural elasticity, and pulls the conjunctiva over the tarsal margin, so that the edges of the eye-lids are bordered by a broad red vascular band; this red band, or border, is, in fact, the conjunctiva drawn downwards upon the cheek, (for the defect seldom exists in the upper eye-lid) and inflamed by exposure to the air. The slighter and milder forms of this affection only exhibit a trifling degree of rigidity of the palpebral integument, the eye-lid being a little pulled away from—not being in close contact with—the surface of the eye, the conjunctiva being scarcely at all exposed, and very little more vascular than usual.

2.—Inflammation of the conjunctiva, by inducing a tumid and thickened condition of that tunic, may cause ectropium, and the same effect may take place from relaxation of that part—thus it may happen that the acute gonorrhœal ophthalmia may be merged into a subacute inflammation of the conjunctiva, which may render that membrane thickened and vascular, so that it is rolled out, as it were, upon the cheek.

3.—Ectropium may arise from a shortening of the palpebral integument, and, in tracing the progress of a case of this description, it will be noticed that, when the shortening of the skin of the eye-lid takes place, its mucous lining is exposed, and that in consequence of such exposure to the influence of the atmosphere, it undergoes various changes; so that if we were not to inquire carefully into the circumstances of the case, and obtain a correct history of its origin, we might suppose that the disease originated in this morbid condition of the conjunctive membrane, which is, in fact, but the effect of other mischief, which involves and comprises the primitive and essential cause of the ectropium. Various diseased states of the skin of the face, by which the elasticity of its texture is impaired, may produce ectropium—this effect, as well as its extent, will depend on the degree of morbid rigidity the integument has undergone, and the proximity of such altered integument to the palpebra.

4.—Sometimes the ligament which is attached to the bone and connects together the nasal extremities of the tarsal cartilages, becomes relaxed, and permits a slight form of ectropium, which is particularly evident at the inner canthus, and which is always connected with a very troublesome degree of stillicidium lachrymarum. The accidental division of the skin, at the outer or inner canthus, may also cause ectropium of that side of the lid which is the seat of the injury.

There are certain effects produced by ectropium upon the eye, which are common to all its forms, the more usual of which are, slight inflammation and irritability—epiphora, or stillicidium lachrymarum; and, as I have already explained, when the palpebral conjunctiva is much, and for a long time, exposed to the air, certain changes occur in it, the more frequent of which are, increased vascularity with tumefaction, from intertextural or submucous deposition, and loss of its smoothness and equality.

*Treatment.*—When the eye-lid is very slightly shortened, with a red and thickened state of the conjunctiva, or when, without any shortening of the eye-lid, this tumid and thickened state of the conjunctiva exists, independently of the presence of acute inflammation, the method of treatment is essentially the same. The object we have in view is, to lessen the enlargement of the conjunctiva. This may be done by excision, by scarifications, or by other operative proceedings; by the use of caustic, or by means of various astringent and stimulating applications. For the purpose of relieving the ectropium by operation, we evert, as much as possible, the vascular and tumid conjunctiva, and, with a small scalpel, make two incisions quite through its substance into the infrajacent cellular membrane, nearly along its whole length, which shall meet at their extremities and include between them a portion of the redundant and thickened membrane, varying in its breadth with the extent of the defect its removal is intended to remedy; or, as others advise, we may cut away a portion of the swelled conjunctiva with a pair of curved scissors, but, in the latter method, we cannot calculate upon the portion to be removed with equal precision, and the operation is upon the whole more painful, and the cure often incomplete, in consequence of the jagged and irregular state of the edges of the incision. It is not necessary to bring the divided edges of the mucous membrane together, after a part of it has been removed, for, they generally approach, and are eventually united through the medium of granulations which are formed between them. Or, instead of this, an incision may be made through the skin of the eye-lid at about a third of an inch from the tarsal margin quite down to the conjunctiva, which should be pulled through the edges of the wound and fixed there by means of sutures passed through the skin on both sides of it. There are, however, but few cases to which this plan of treatment is applicable; it may be tried in the slight forms of the disease—in those forms of it which are just incapable of being cured by the application of the sulphate of copper and the various astringent and stimulating remedies to be presently recommended. If there be any material shortening of the palpebral integument, this operation is inappropriate; it is also an unsuitable operation where the conjunctiva is much thickened and indurated by intertextural and submucous deposition. If the operation be performed under this pathological condition of parts, the palpebral integument will be pulled inwards by the mucous lining of the lid, and will form a very disagreeable puckering and tucking inwards of the skin at that part; and the tarsal margin will be thrust outwards—away from the eyeball, in a corresponding degree. To render the operation useful, under this condition of circumstances, it would be necessary to divide the conjunctiva, and to excise, by careful dissection with a scalpel, a portion of the inflammatory deposition connected with, and situated beneath it, and then to sever the skin of the eye-lid so as to make "a button-hole" in the part, draw the mucous membrane through the opening and fix it there by means of sutures —attaching, at the same time, a piece of thread to the strictured portion of conjunctiva, and fixing it to the cheek, for twelve hours after the operation, so as to prevent the palpebral integument from being tucked inwards—pulled towards the eye-ball. This operation is best adapted to the cure of ectropium of the upper eye-lid (which, however, rarely takes place except in connexion with a loss of the palpebral integument), for, on account of the greater support that part derives from the eye-lid, the tendency, on the part of the *edges of the wound*, to turn inwards, is greatly diminished.

If the ectropium is not very considerable, it is desirable to try the effect of a strong zinc or alum lotion, and, if they fail, the part may be touched with a powerful solution of the nitrate of silver, (eight grains to the ounce of distilled water) or with the undiluted liquor plumbi acetatis, taking care to prevent them from touching the healthy parts of the eye, and to prevent the part which has been dressed from coming into contact with the globe immediately after the stronger of these remedies has been applied. Another and a very excellent method of diminishing this red and tumid state of the conjunctiva consists in applying the sulphate of copper to the part, about every other day at first, and afterwards every day. It should be rubbed upon the tumid conjunctiva for about a minute; the part which has been rubbed should be prevented from coming into contact with the eye-ball, until, by means of ANEL's syringe, a little warm water has been injected upon the irritated mucous surface of the palpebra. More powerful applications than those I have mentioned have been recommended, such as the potassa fusa, the nitric and the sulphuric acids, but where the object is the prompt destruction of the tumid and morbid conjunctiva, I always prefer to excise it rather than to destroy its vitality by such potent applications. If the ectropium depend on a harsh and rigid state of the skin of the eye-lid, it is generally rendered worse by the stillicidium lachrymarum which is present. To relieve this state of things I usually advise the free use of the unguentum plumbi upon every part of the rigid skin, and, at the same time, recommend the use of the zinc or alum lotion to the eye.

When ectropium is produced by a loss of the cutaneous texture, from sloughing, or by the corrugation and inelasticity of the skin consequent on a severe burn, it is in vain to attempt the cure of the defect by removing the conjunctiva. In this way, it is true, the eye-lid may be shortened and *lagophthalmos* may be produced, but the production of this state of things appears to me to be a change for the worse. The first of these forms of ectropium may be relieved by the following operation:—with a curved bistoury divide the skin of the eye-lid nearly from the inner to the outer canthus, just above, and on the ocular side of, the margin of the orbit, then separate the edges of the wound and allow it to heal by the process of granulation, taking care, during the early part of the healing process, to keep the edges of the wound apart.*

---

* MR. LAWRENCE (*A treatise, &c.* p. 350) attributes this practice to JAEGER and JUENGKEN (*Handbuch*, p. 696), but it was advised, practised, and very circumstantially described a hundred years ago by PLATNER, (*Institutiones chirurgiæ*, § 582) as well as the proper bandages and other means required for keeping apart the edges of the wound. He thus concludes his remarks on the operation, which he conceives to be alike suited to lagophthalmos, and to ectropium dependent on a loss of the palpebral integument:—Si curatio bene cedit, cicatrix latior nascitur, quæ si eum locum implevit, recte oculus operiri potest."—The same operation was recommended by BANISTER more than a century before PLATNER wrote his spendid work on surgery, and he describes it in that chapter of his book which treats of lagophthalmos, as well as in that in which he speaks of ectropium.—He remarks, " if ectropium haue proceeded from incision, burning, searing, cicatrizing in the eye-lid, then must incision be made of the skin, in the outward part, not farre from the eye-lidde, which beginning at one corner of the eye shall end at the other, making separations of the edges with lint put between them, lest they should join again."—The same operation is recommended with equal earnestness and described with greater precision by HEISTER and DIONIS.

Should there be a severe form of ectropium produced by the thickening, puckering, and induration of the skin of the eye-lid, with perhaps a loss of part of it in consequence of a burn, it would be desirable to excise the prominent ridges of skin, and cut a portion of integument corresponding to the size of the wound—and as much as may be necessary to restore the tarsal margin to its proper place—from the temple or some convenient part, twist it round by means of the narrow slip which is left to sustain its life until it has obtained other vital connexions, and fit it into the wound, and accurately secure and adapt its edges to those of the severed skin by means of a sufficient number of delicate sutures. Almost any extent of defect may be remedied by means of this operation;* and it is equally well adapted to the relief of ectropium connected with a loss of the palpebral integument, and adhesion of the skin of the eye-lid to the periosteum of the orbit, except that it would be more difficult of performance inasmuch as it would be necessary to destroy the morbid adhesion

---

* It is astonishing how perfect will be the vitality of the extreme point of the slip of skin which is transplanted, and how little risk there is of the failure of the operation in consequence of the mortification of the intruded cutis. In the case related at page 728, the point of the narrow slip of skin, where it passed upon the nose, must have been at least an inch and a half from its base, which was very narrow, yet it never appeared discoloured, or at all likely to slough. I have operated in two cases under pretty nearly the same circumstances, and have had no reason to be fearful, on account of the state of the intruded skin, that the success of the operation would be interfered with. It is seven years since I performed one of these operations, and it has effectually relieved the defect up to the present time. The marks of the incisions, and the line of union between the once severed parts, are still visible. Ectropium dependent on an extensive loss of the palpebral integument was, however, formerly considered by "controlling authorities" to be absolutely irremediable. "Si nimium palpebræ deest," says CELSUS, "nulla id restituere curatio potest."—"If the eyelid bee too short," says BANISTER, "it is vmpossible to recouer it by any kind of cure or operation." SCARPA affirms that "dans la seconde espece de renversement, la chirurgie ne peut remédier parfaitement à la perte d'une portion de peau des paupières, ou des parties voisines, qui ne peut restituer aucun des moyens jusqu'alors connus."

(which is a difficult and tedious process, and attended with some risk of injuring the skin) before the case is reduced to the condition of ectropium associated with the contraction of the palpebral integument consequent on a burn of that part. I have now under my care two individuals upon whom I am about to perform this operation—namely, a young lady in Ravenhurst Street, and a young man residing in Banbury Street. The ectropium exists in both cases in the upper lid. In the first of these cases the ectropium is not considerable, but the palpebra being attached to, and drawn within, the orbit, from disease of the bone, (which is now cured) causes the eye to be scarcely at all covered. The state of slight ectropium and serious lagophthalmos may be relieved by shortening the intertarsal slit by attaching together the tarsal margins for a short distance at the outer canthus, but it may be much more completely remedied by including the adherent integument in an elliptical incision, dissecting it away from the orbit and thus entirely removing it, and afterwards inserting a properly adapted portion of skin, taken from the temple or forehead. In the second case the shortening of the eye-lid is greater, its extent of adhesion more considerable, and the conjunctiva much everted, very vascular, and amazingly thickened, so that it will be necessary to excise an elliptical piece of the conjunctiva and the indurated matter connected with its cellular aspect, in addition to the adoption of the other operative proceedings I have just described.*

If ectropium is caused by a peculiar extension of the intertarsal slit from local injury, or from an irregular division of the eye-lids at either canthus, the defect is best relieved by pairing the edges of the divided parts by means of a small scalpel, and afterwards uniting them by one or more sutures according to the extent of the part divided. If this defect be permitted to exist, the eye becomes excessively irritable from undue exposure, the patient is teased with an incessant stillicidium lachrymarum, which is excessively annoying when going into the open air, and changes take place in the texture of the conjunctiva which no subsequent treatment will entirely take away. Sir W. ADAMS performed rather a singular operation for the cure of ectropium, based on an equally singular, though somewhat ingenious, view of its cause. He assumed, that where a thickened and enlarged state of the conjunctiva was connected with ectropium, the eye-lid was pushed downwards and outwards, lost its horizontal position, and acquired a somewhat crescentic form, its concavity being formed by the everted tarsal margin ; and he represented, as the consequence of the continuance of this condition of things, an increase in the breadth of the eye-lid, that is, from the external to the internal angle. But, admitting that his view of the subject is correct, namely, that the tarsal cartilage can undergo *elongation* from the pressure of the enlarged and swollen conjunctiva, independently of primary disease of its texture,* I do not know

---

* It is stated that the mere division of the adherent skin, quite down to the bone, will furnish sufficient space to enable us to detach it, but as this is more easily accomplished by removing a small portion—a narrow slip—of skin, at the point of its attachment, and as it is generally diseased at that point, I prefer to adopt the latter

---

method. A celebrated surgeon has lately taken to himself great credit for *proposing* this operation ;—had I thought there was any thing importantly new in my mode of performing it, or in the principle of the operation itself, I could, on sufficient evidence, readily strip him of the *laurels* he now so complacently wears.

* Sir William brings forward no proof of this; SCARPA, however, speaks of " a softening of the cartilage of the tarsus, in consequence of a copious and long-continued puriform discharge from the ciliary glands," which, *if it really took place*, would, of course, render that part more susceptible of extension from a slight degree of pressure than it would be in its perfectly normal state.

what very injurious effect this simple and trivial extension of the eye-lid in the lateral direction would produce, beyond that of exciting some degree of epiphora and rendering the eye-lid less close in its adaptation to the globe than it would otherwise be. However, Sir W. Adams lays great stress upon the extension of the eye-lid in the lateral direction as a cause of ectropium, and the shortening or narrowing of this part as a means of curing the defect. He says, when describing the operation, " I have not specified the length of that portion of the lid necessary to be removed, since this depends on the degree of elongation, and consequent eversion, and must, therefore, in a great measure, be left to the judgment of the operator."* The operation Sir William proposed was somewhat similar to that I have already described, except that, in addition to the excision of the enlarged and thickened conjunctiva, he recommends that a small portion of the centre of the eye-lid should be removed. He cut out a small portion of the palpebra, of the form of the letter V, with a pair of strong sharp scissors, the point of the V being directed from, and its broad part towards, the tarsal margin, he then brought the lips of the incision together by means of fine sutures, and his success was so great, whilst the operation itself was so simple, that, to use his own words, " none of the patients on whom I have operated, for this malady, have ever been subjected to a relapse. It has often surprised me, that this simple operation, which has proved uniformly successful with me, should not have occurred to Professor Scarpa, or so far as I have been able to discover, to any of those ingenious practitioners who have professedly written on the subject."* I presume it was from knowing that the division of the tarsal cartilage and consequent lengthening of the tarsus, often relieved inversion of the eye-lid, that Sir W. Adams conceived the eye-lid became extended in the lateral direction when affected with ectropium; but, of course, it by no means follows that, although the tarsal cartilage may experience certain changes of figure from disease of its own or neighbouring structures, it may become mechanically expanded and elongated by the pressure of the tumid conjunctiva.

---

* *Practical observations on ectropium*, page 6. London, 1812.

If the ectropium is occasioned by an extensively diseased state of the skin of the face, or by cicatrices of that part from disease or injury, I do not know that it can be relieved, except by the aid of those general measures which the nature of the particular morbid affection of the cutaneous texture may require. The local affection may be palliated by soothing applications, and by applying mild ointments to the skin of the eye-lids, and the patient may be recommended to defend the eyes as much as possible, from the influence of the atmosphere, from dust, and other sources of irritation, by means of a green shade, or by the use of a pair of green, blue, or gauze spectacles.

If ectropium be allowed to continue, it will render the eyes very susceptible of inflammation, and impair vision, besides constituting a very loathsome and a most unsightly defect. It must be admitted, therefore, that the painfulness and extent of the operative proceedings are advantageously encountered, when we take into consideration the direct benefits they confer, and the evils they avert.*

---

* *Ibidem.* Page 7.—Sir William's operation, though approved by Mr. Travers (*A synopsis*, p. 240,), appears to be a bad imitation of the following method, advised by Banister. If, says he, the ectropium return in a great degree "then must two ouerthwart incisions be made gently, in the innermost part of the eye-lidde, which shall begin in the middest and lower part of it, being drawne both ouerthwartly, one to the great corner, the other to the lesse, nigh vnto the eye-lidde, and hauing gathered both together, there will bee taken away a little piece, like vnto the great letter of the Grecians, named V, being, notwithstanding, carefull to auoid cutting of the skinne in such manner: let the point of it be to the lower part and bottome of the eye, and the larger open part arise and ascend towards the eye-lidde." Sec. iv. chap. ix.

## SECTION XII.—ENTROPIUM.

There is a defect of the eye-lids which essentially consists in the inversion of the tarsal margin so that the cilia are forced, or permitted to fall, against the eye-ball. On observing an eye in which the palpebræ are so diseased, we perceive at first, perhaps, that its surface is more or less inflamed and irritable, that the tarsal margin appears smooth and round, and that the eye-lashes are apparently wanting; but, on drawing down the lower lid, or on separating the lids so as fully to expose the globe, we discover that they are forced against the eye, by the rolling inwards of the border of the lid. The necessary effect of this inversion of the eye-lid and eye-lashes will be, first, to produce slight inflammation; if it continue still longer the inflammation will be converted into an established form of chronic disease, the cornea will become opaque, its conjunctival covering thickened, and eventually one of the worst and most inveterate forms of pannus will be produced. I have never observed that entropium is congenital, and therefore it appears to me that its existence depends on circumstances connected with the habits of the individual, or on the characters of the previous disease to which his eyes have been subject.

---

* A full account of the various operations employed for the cure of ectropium, is given by HEISTER, (*Institutiones chivrgicæ*, p. ii. sect. ii, cap. xlviii.) PLATNER, (*Institutiones chirurgiæ rationalis tum medicæ tum manualis*, § 583.) BORDENAVE, (*Mémoires de l'académie royale de chirurgie*, Tome v. p. 97.) DEMOURS, (*Traité des maladies des yeux* Tome i.) COOPER, (*Dictionary of practical surgery,*) and GUTHRIE, (*Lectures on the operative surgery of the eye.*)

Those forms of entropium which depend on a relaxed state, and on superabundance of the palpebral integument, generally occur in the lower eye-lid, and, on the contrary, entropium dependent on various morbid changes in the texture, or alterations in the figure, of the tarsal cartilage usually take place in the upper lid. When the inversion is very complete, so that the edge of the eye-lid appears round and smooth and its cilia are not to be observed, the eye is less irritated than when the inversion is less, for then the eye-lashes are turned more directly towards the globe. Persons affected with this disease sometimes cut the eye-lashes very short—close to the tarsal margin—and they have often called upon me afterwards suffering dreadful pain from the friction of the short strong hair upon the surface of the globe. If the eye-lashes are long and the inversion very complete, the patient will suffer less pain from the malady than he would do if the eye-lashes were short and stumpy and the inversion so slight as merely to admit of their direct friction upon the eye-ball.

*Temporary entropium.*—Entropium may be either temporary or permanent. During the existence of acute (and especially if strumous) ophthalmia, the powerful and spasmodic action of the orbicularis muscle upon the tarsal margin may cause its inversion, which may render the cure of the inflammation very difficult, and which may remain for some time after the disease which occasioned it has subsided. So long as the acute part of the inflammation continues, it is adviseable merely to draw out the eye-lashes of the lower lid (for the upper is rarely affected with this form of entropium) and to direct the patient or his friends to draw it downwards with the fingers whenever the eye-lashes are felt to be irritating the globe. As soon as all active irritation has subsided, the patient should be directed to wear a piece of wire somewhat similar to a spectacle frame, and so contrived as to press upon and indent the eye-lid near the edge of the orbit, and thus direct the tarsal margin outwards. Or, the eye-lid may be drawn downwards, a small pad of soft lint firmly pressed upon it about two-thirds of an inch from its ciliary border, and secured there by means of transverse strips of adhesive plaster. Or, a broad piece of adhesive plaster may be passed obliquely downwards from the inner canthus upon the cheek, and so folding the skin beneath the plaster as to draw the tarsal margin downwards; this broad band of plaster should then be fixed in its situation by several narrow strips placed transversely. By thus giving to the edge of the eye-lid a natural direction, some very bad forms of entropium even occurring in elderly persons in conjunction with inflammation of the eye, have been very perfectly cured.

*Entropium produced by spasm and hypertrophy of the orbicularis muscle.*—Sometimes the orbicularis muscle is irritable and spasmodic in its action, or, from an increase in its volume, its power may be much augmented. In the first place, such general remedies as the particular state of the constitution may appear to require should be administered, together with the local application of the extract of belladonna, or an aqueous solution of opium, or a strong poppy fomentation should be applied to the part.* A spasmodic state of the orbicularis palpebrarum is generally produced by an increased sensibility of the retina to light, and ceases on the restoration of the natural sensibility of this delicate texture, so that the treatment of entropium thus produced, is, in fact, but the treatment of the ophthalmia with which it may be associated; but when this powerful and spasmodic state of the orbicularis palpebrarum is long continued, it may occasion certain changes in the figure and direction of the tarsal cartilage, which may perpetuate the entropium. The method of curing entropium arising from hypertrophy of the orbicularis muscle, consists in cutting through the palpebral integument quite down to that muscle, and removing a portion of its fibres corresponding to the extent of the entropium, with the curved scissors.

---

* See my remarks on "spasm of the eye-lids."

*Senile entropium.*—In old persons the skin of the eyelids is much relaxed and superabundant, particularly if, having been very fat, they are become, by age and infirmity, much emaciated. In such individuals the action of the orbicular muscle upon the tarsal cartilage, not being regulated by the natural elasticity and tension of the palpebral integument, is turned inwards, and, of course, the cilia are carried with it in the same direction. A healthy condition of the skin and the mucous membrane of the eye-lid is necessary to constitute those antagonizing powers which maintain the due position and proper equality of the tarsal margin.

When the palpebral integument is much relaxed, and folded, and wrinkled, so that the skin appears to be too long, too ample for the part it covers, without being connected with any vicious inclination of the tarsal cartilage, the cilia may turn against the eye, and may produce considerable irritation; but there is an important difference, both in the direction of the eye-lashes and the degree of irritation to which their morbid direction gives rise, when produced from this cause, and when arising from entropium occasioned by a preternatural incurvation either of the whole border of the tarsal cartilage, or of its angles only. In the former case the eye-lashes are rolled so much inwards, as to be completely out of view, unless the palpebra is separated from the eye-ball, so that the eye-lashes are partly directed towards that part of the eye where the conjunctiva is reflected from the eye-ball to the palpebra, and is wholly, or partly, placed between the sclerotic and palpebral portions of the conjunctiva, or rather at the point where this artificial distinction is said to commence. Whereas, when the cilia are directed towards the globe, in consequence of a vicious and morbid incurvation of the tarsal cartilage, the irritation excited is much more considerable, just in proportion as the inversion of the eye-lashes is more direct.

The mode of removing this defect is very simple. Having grasped a portion of the skin of the eye-lid with a forceps, possessing broad blades, (the entropium forceps,) and having ascertained, by pinching up the integument and observing its effect upon the tarsal border, how much skin it is necessary to remove, in order to relieve the defect, cut it away either with a pair of curved scissors, or a small sharp scalpel. When this is accomplished, the edges of the incision may be pressed together, and if, when this has been done, the entropium still continues, though in a much more trifling degree than before, a few of the fibres of the orbicularis muscle may be cut away, and this will always be sufficient to remove the defect. In performing this operation, it is necessary to bear prominently in mind two things; first, to take care that the incision of the skin extends along a space nearly as great as that which exists between the external and the internal angles of the eye-lids; and secondly, that its breadth is so considerable, as that the inversion shall be completely remedied when the divided edges of the skin are brought into contact.*

*In what manner does this operation remove the entropium?*—It will be remembered that, in the natural and healthy state of parts, the skin of the eye-lid is connected with the orbicularis palpebrarum by means of an elastic cellular membrane, which exists in this part in great quantity, and that the nature of such connexion permits a great extent of motion of these structures upon each other, but when a large portion of the integument of the eye-lid is removed, without injuring the muscle beneath, the motion of the former upon the latter is diminished by the removal of a great portion of that tissue upon which such motion depends; and further, when a portion of the muscle is removed with the integument, then the movements of the one upon the other is still further diminished, and the skin becomes, to a certain extent, firmly adherent to the fibres of the muscle. When, therefore, a portion of the palpebral integument merely is removed, the cure of this form of entropium would appear to depend on the influence produced by the loss of the skin, and, on its capacity when so shortened, to act as a proper counterpoise to the tendency of the orbicularis muscle and the conjunctiva, to draw the tarsal margin inwards; but when a portion of the orbicularis muscle is also removed the cicatrix of the skin adheres to the fibres of the muscle, the muscle is rendered less powerful by the loss of a part of its fibres, whilst the tension of the skin is increased, and its elastic and extensile property diminished, and, of course, the degree to which it will extend, or admit of extension, is lessened in the ratio of its diminished quantity, so as, in fact, to counteract, more or less completely, the tendency of the orbicularis muscle and of the conjunctiva to produce entropium. So that, in this explanation we observe three chief circumstances combining to correct the faulty direction of the eye-lashes; —1, the loss of a portion of the palpebral integument;—2, the removal of some of the fibres of the orbicularis palpebrarum;—and 3, the adhesion of the skin to the orbicularis muscle.

---

* It will often be necessary to remove a very considerable portion of skin for this purpose, varying in its breadth from three quarters of an inch to an inch and a half.

*Entropium dependent on a diseased state of the conjunctiva.*—If entropium arise from the formation of frenulæ, connecting the lid to the globe, the necessary means of removing such frenulæ should be at once adopted, or if, from the situation of the frenulæ and other causes, they cannot be removed, and the whole of the ciliary border of the tarsal cartilage has acquired an incurved direction, the effect of excising a large portion of the palpebral integument may be tried, and if this operation also fail to afford material relief, it would be adviseable to excise the tarsal margin, as will be explained when treating of trichiasis.

A thickened, rigid, and granular state of the conjunctiva may produce entropium; first, by the undue power of the inner, as compared with that of the outer, membrane of the eye-lid; and secondly, by the ocular irritation it excites, whereby a spasmodic action of the orbicularis muscle is produced, and an increased tendency to entropium communicated. I have examined the conjunctiva in this state after its division—it appears to be shortened, and thickened, and indurated, and the cellular membrane with which it is connected to the palpebral integument and the muscle beneath is increased in quantity and firmness, and is arranged in a laminiform manner. At all events, if it be not increased in quantity it is consolidated with adventitious deposition so as to have acquired an augmented volume and a character of semi-cartilaginous firmness. The first part of the treatment of cases of this description would consist in the employment of the proper means for the cure of that form of disease of the conjunctiva which was present, and, when this is accomplished—when the conjunctiva is rendered as healthy as it can be rendered by treatment—then it would be desirable to operate for the remaining entropium. For this purpose the intertarsal slit should be slightly extended towards the temple, so as to admit of the complete eversion of the eye-lid, the diseased conjunctiva should then be completely divided by an incision made parallel with the tarsal margin, and about a quarter of an inch from it, a portion of the palpebral integument is then to be excised, so as to secure the extension of the wound in the conjunctiva and correct the tendency to entropium.* Should the morbid state of the

* A trivial modification of this operation is advised by Crampton and Guthrie. It appears to have been the favourite method of operating two centuries ago. On the treatment of entropium and trichiasis Banister says, "you must labour to gather and tie vp the hairs, by a plaister framed after the manner of drie stiching. When all are thus gathered and made fast to the outward part, let them so abide a good space, that they may not return into the eye, but receiue another shape: if the edge of the eye-lidde bee also turned inward, yet the eye-lidde not loosed, there must be incision made on the inside in a straight forme or line, that by this meanes, the skin may be separated and let loose, which did draw the eye-lidde inward, and the haire jointly with the same may look vpward." London, 1622.—"Si la faute (trichiasis, which is used synonymously with entropium) en étoit à la membrane interne qui seroit trop retirée, il faudroit après avoir d'une main retourné la paupiere y faire avec ce scalpel une petite incision longitudinal pour la débrider, et lui donner moyen de s'allonger." Dionis. *Cours d'operations*, p. 540. Paris, 1750.—The dependence of entropium on a diseased state of the conjunctiva has been well known ever since the days of Banister, and the adoption of treatment has had in view, first, the division of the morbid conjunctiva, which caused the diseased incurvation of the tarsal margin; and secondly, the employment of various means of giving an outward direction to its angles and border. So that the reviewer of Mr. Crampton's *Essay on entropeon*, appears to have behaved towards that

conjunctive membrane be associated with a change in the form of the tarsal cartilage, a different mode of procedure will be required; for, it will be remembered, that a morbid state of the conjunctiva competent to produce entropium so long as it exists, may, by continuance—if the very probably *then* remediable defect be not attended to—be rendered capable of altering the figure of the tarsal cartilage, so that when at length the original disease is removed, the entropium continues from the incurvation of the tarsal cartilage so induced.

*Entropium from disease or alteration in the form of the tarsal cartilage.*—The tarsal cartilage undergoes certain alterations of form and texture, which direct the margin of the eye-lid, and, of course, the cilia, inwards; and the changes to which I particularly refer may be the consequence of long continued inflammation, whereby either the conjunctiva is rendered thick and granular, or the orbicularis muscle stronger, and also spasmodic in its action; and the changes themselves may consist in an unnatural incurvation of the canthal extremities of the tarsal cartilage, or a general inversion of its ciliary border; or the variations in the figure of the cartilage leading to entropium, may result from disease of its own structure, such as inflammation, ossification, and so on. A shortening, induration, and contraction of the ligament connecting together the inner canthal extremities of the tarsal cartilage, will produce only partial entropium. When the canthal

---

gentleman with mistaken kindness in stating that "most authors have conceived that the entropeon arose either from a preternatural prolongation of the external integuments, or from a diseased action of the levator palpebræ muscle. MR. CRAMPTON, after having shown the inconsistency of the theories on which these opinions rest, and the insufficiency of the practice founded on them, for the cure of the disease, *demonstrates that the true nature of the disease is a contracted and thickened state of the conjunctiva membrane lining the eye-lids.*" *Edin. Med. and Surg. Journal*, Vol. iv. p. 120.

extremities and the ciliary margin of the tarsal cartilage are much turned towards the eye-ball, I have observed that the part is hardened, and that sometimes specks of ossific matter are scattered throughout its texture, and on removing it from the eye-lid, after the death of the patient, it has retained the morbid incurvation it possessed during life. I have several times noticed a deposit of matter upon the cutaneous aspect of the tarsal cartilage, which resembled the material of which that part is composed; these depositions are generally confounded with what authors term tarsal tumours, which rarely *arise from* the tarsal cartilage, but become *connected to* it by the increase of their size. The entropium which occurs in old age is generally dependent as much on the induration and shrivelling of the tarsal cartilage, as on the superabundance and diminished elasticity of the skin.

The relief of entropium, caused by a contraction of the ligament which connects together the inner canthal extremities of the tarsal cartilages, is to be attempted by lengthening the intertarsal slit towards the nose, and, if necessary, removing, at the same time, a small portion of the skin of the upper and lower eye-lid, near to the ciliary border, and towards the inner canthus.

*Operation for the removal of entropium dependent on a preternatural incurvation of the ciliary margin of the tarsal cartilage.*—If the defect be seated in the cartilage of the lower eye-lid, it has been recommended to pass a fine sharp pointed bistoury beneath it, with its point directed downwards, and its cutting edge towards its mucous membrane, and, having previously drawn the palpebra from the surface of the eye, urge the bistoury through the whole substance of the eye-lid, near to its external angle, and draw it gently outwards; in this way we make an incision perpendicular to the tarsal margin, cutting through the conjunctiva, the tarsal cartilage, and the palpebral integument, and varying in its length from one to five lines. Having accomplished this, ascertain the state of the eye-lid, and carefully observe to what extent the operation has relieved the defect; if the inversion be removed by this single section, we have only to pass a fine ligature through the eye-lid near to the incision, draw its margin slightly downwards, and fix the ligature by adhesive plaster, so that the part shall be constantly kept upon the stretch, and a slightly *everted*, rather than an *inverted*, state of the eye-lid produced. But it may also be necessary to divide the eye-lid towards its inner angle in the same manner, and to maintain an everted condition of the palpebra by means of two ligatures, one passed through the integuments of the eye-lid near to its inner, and another towards its outer, incision, which are to be fixed in the manner I have previously mentioned. And lastly, when, in addition to the incurvation of the tarsal cartilage, the palpebral integument is loose, superabundant and relaxed, it may be found necessary, not only to cut through the eye-lid, in the way I have just described, but also to remove a portion of the skin immediately behind, and parallel with, the margin of the lid, and then to unite the separated portions of skin by the necessary number of sutures, and instead of cutting them off, pass them beneath a strip of adhesive plaster (which is placed over the wound) to the precise margin of the eye-lid, then turn them backwards or downwards, over the edge of the plaster, and fix them on the cheek or forehead, (as we may happen to be operating upon the upper or the lower lid) by additional strips of plaster. In this way, it is said, we effect several important objects:—namely, the correction of the incurvation of the tarsal cartilage, by dividing it towards its angles, and by drawing the eye-lid downwards by means of the threads

which are passed beneath the plast
tarsal margin; and we also remove, b
the superabundant integument whic
the inversion of the palpebral ma
necessary to do even more than thi
tion of the tarsal margin is more con
eye-lid is divided by a short incisio
ciliary border, at both its external
and when a portion of its integum
by a separate operation and its d
together by sutures, the surgeon
three ligatures quite through the ey
margin, and drawing them downwa
tarsal cartilage, fix them in the man

If these means fail—if the ciliar
margin is so turned inwards as to
rub against and much irritate the e
sary to excise the tarsal margin at
include the hair capsules.

*Operation.*—Take a piece of h
which is adapted to the breadth
which is convex on one side, and c
surface, and, on the convex surfac
near, but not close to, its margin,
shallow groove; draw the eye-lid o

---

* This operation is much better suited
than of the lower lid, for, the forehead prese
the whole, a better surface for securing th
tarsal margin, than the cheek. When the
to remain for a few days, I usually rem
already cut their way outwards, and it is
the perpendicular incision at the angles
allowed to heal slowly and by a process of
of contracting the length of the eye-lid as
to heal by the first intention, they absolut
interposing the matter of the granulation
the incision.

of this piece of horn so as to put it slightly upon the stretch, and then, commencing an incision at the inner angle of the eye, just to the outer side of the lachrymal punctum, excise the tarsal margin by a rapid sweep of the knife from its internal to its external angle, and at about the eighth of an inch from its tarsal margin, so as to include the hair capsules. Instead of cutting gradually inwards at the internal angle of the eye-lid, and gradually outwards at its external angle as I have advised, it is generally recommended to make an incision at the inner angle of the eye-lid, perpendicular to its ciliary margin, and about the eigth of an inch in length, and a similar section towards its outer angle, which incisions are to be connected by a horizontal one, commencing at the termination of the incision at the inner angle, and terminating at that part of the incision at its outer angle, which is most distant from the tarsal border. In each case the object in view is the same; namely, the excision of that part of the eye-lid which contains the hair capsules, and the part to be avoided is the lachrymal punctum; and I merely recommend the perpendicular incisions to be omitted, because they produce some deformity and considerable inequality of the tarsal margin. There is very little to be said about after-treatment, for, all we have to do is, to to confine the patient for a few days to the house, and to direct him to bathe the eyes with warm water, to avoid any great exertion of them, or of the muscles of the face, and to take a dose or two of opening medicine.

If one or more of the eye-lashes are found to grow, after the tarsal margin has been removed, the hair or hairs may be extracted, the skin punctured in the situation of its bulb, and then touched with a bit of lunar caustic worked to a very fine point. When, from some irregularity of the incision of the tarsal margin, a cluster of the cilia remain, make a V incision, the broad part terminating at the ciliary margin of the eye-lid, and its sharp point placed in a contrary direction, so that the whole portion of the tarsal margin, in which the cilia grow, shall be comprehended in, what may be termed, the base or broad part of the V incision.

*Entropium dependent on an inversion of the canthal extremities of the tarsal cartilage.*—In slight cases of entropium dependent on an unnatural incurvation of the canthal extremities of the tarsal cartilage, I am in the habit of performing an operation for its relief, which is quite as effectual, and far less painful and elaborate than that I have just described. My mode of procedure is developed in the following case.

Case.— — White, æt. 32, a mason's labourer, has suffered from chronic ophthalmia and tinea for several years. The eye-lashes of the upper lid are turned against the eye-ball, the tarsal cartilage is very slightly curved inwards towards its ciliary border, and very much so at its canthal extremities. The cornea is very vascular and cloudy, and the eye is weak and irritable.

*Operation.*—Having placed a small smooth piece of hollowed horn upon the surface of the eye, and drawn the eye-lid tightly over it, I made incisions through the palpebral integument, so as to include a portion of skin, of a sort of hour-glass figure, except that its two extremities formed a *very blunt cone.* I then brought the edges of the wound together at its middle by means of a single suture, and suffered the other parts of it to heal by a process of granulation. The result was exactly as I could have wished;—the eye-lid was a little shortened at its middle, and much shortened at its extremities, so that the defect, although not quite cured, was very materially relieved. Since the time at which I performed this operation, I have been enabled to regulate my incisions with greater precision, so as more accurately to adapt them to the extent of the mischief I am solicitous to relieve.

I have several times noticed entropium caused by conical and partial staphyloma of the cornea. I removed a conical staphyloma of the cornea a few weeks ago from a child at Tardebigg, and, in her case, the tarsal cartilage was so altered in its position that its orbitar margin was thrust upwards, and its ciliary border together with the eye-lashes folded downwards beneath the globe, and between it and the palpebra. I have never noticed this condition of the eye-lid in the true conical cornea, nor in the globular variety of staphyloma.

It has been recommended to procure the relief of entropium by dissecting entirely away the tarsal cartilage, which, under some conditions of disease, is a truly painful and very difficult proceeding. It has also been suggested that where there is an evident incurvation of one or other of the extremities of the tarsal cartilage, it should be divided from the tarsal margin downwards for about three lines, and the mucous membrane of the inverted portion connected with the skin of the eye-lid:—by thus attaching the skin of the free part of the eye-lid, to the mucous membrane of its inverted and confined portion, the morbid incurvation may, it is said, be completely corrected.

Various means of counteracting the inversion of the tarsal cartilage have been suggested, of which I have not spoken; such as, the destruction of the skin by means of certain caustic substances, and particularly of sulphuric acid*—gluing the eye-lashes to the integuments posterior to their bulbs—pulling the margin of the eye-lids outwards, by ligatures, either tied to the cilia, or passed through the integument at the tarsal border.[*]

---

* This mode of curing entropium has been strongly recommended by HELLING, QUADRI, and BEER, and is referred to, and *not* condemned, by TRAVERS, LAWRENCE, and GUTHRIE. I am prepared, from experience of its effects, to say that it is a painful method of relieving the disease; that it is impossible to limit the destruction of skin, under the use of caustic, with the precision we may do by the operation of excision; and that it is liable to leave behind a very disfiguring cicatrix.

## SECTION XIII.—TRICHIASIS AND DISTICHIASIS.

By trichiasis I mean, merely an inversion of the cilia against the globe of the eye; and, by distichiasis, a double row of eye-lashes. I have only witnessed one instance in which there has been, in the strict sense of the term, a complete double row of eye-lashes,[†] by which I intend such an arrangement of the capsules of the cilia as would necessarily produce a second row of eye-lashes, as perfect and complete, or nearly as perfect and complete, as each other, presuming that the row of eye-lashes which usually grows nearly at the cutaneous margin of the tarsus existed in their usual abundance and situation, and in their customary number. The appearance commonly termed distichiasis is occasioned, not by a double row of the eye-lashes—(one at the mucous and the other at the cutaneous edge of the ciliary border)—but by some distorted direction of the eye-lashes themselves.[‡]

---

[*] The reader may consult on the subject of this section—Hosp, "De diagnosi et cura radicali trichiasis et distichiasis nec non entropii," in *Scrip. Oph. Minores*, Vol. i.; and also in the second volume of the same work, Schmidt, "De trichiasi et entropio."—Jacob, in *Dublin Hospital Reports*, Vol. v.—*An essay on the entropeon or inversion of the eye-lids*, by P. Crampton. London, 1805.—*Practical observations on the principal diseases of the eyes*, translated from the Italian of A. Scarpa, by J. Briggs. London, 1806.—*A treatise on some practical points relating to diseases of the eye*, by the late J. C. Saunders. London, 1816.—*Traité des maladies des yeux*, par A. P. Demours. Paris, 1818.—*Lectures on the operative surgery of the eye*, by G. J. Guthrie. London, 1830.

[†] Bartholin says, that distichiasis is very common among the people of Alexandria and Egypt.

[‡] Case.—Elizabeth Sheppard, æt. 24, has suffered the greater part of her life from irritation of the eyes. On slight examination, there appears to be a good deal of puffiness of the eye-lids, and irritability of the orbicularis palpebrarum. On a more attentive examination, it

The whole of the eye-lashes generally turn inwards when the tarsal margin is inverted; but, when the trichiasis depends on the mal-direction of one or several of the eye-lashes, the defect is frequently as troublesome and as prejudicial in its effects as when the whole of the cilia are turned inwards. Trichiasis is frequently produced by the ophthalmia attendant on small-pox, by strumous inflammation of the eye, by tinea tarsi, lippitudo, and various forms of injury to the edges of the eye-lids.

Hairs sometimes grow from various parts of the conjunctiva; DR. MONTEATH mentions a case in which one very strong hair grew out of the conjunctiva lining the inferior palpebra. It was directed perpendicularly towards the eye-ball, and irritated it; the natural cilia were of a light colour, the pseudo-cilium of a jet black, and double

is found that there is a double row of eye-lashes, as nearly perfect as possible; the tarsal margin appears to be thicker and more angular than usual, so that its mucous and cutaneous edges are sharper and more distinctly developed than ordinary. On its cutaneous edge, and in the usual situation, there is a regular row of strong, black, and properly curved eye-lashes: on its mucous edge there is also a row of eye-lashes, but which is not quite so regular and complete as the other—they are, however, of the same colour; most of them are thick and strong, but a few of them are weak, and of a light-brown appearance. When the eye-lid is a little pulled upwards, they are seen to drag upon the cornea as a series of perpendicular lines. I removed these eye-lashes for her about once in two months, for they grew slowly: when she came to have them extracted, the eye was always a good deal inflamed, but the inflammation ceased a few days after their evulsion, and the eye remained quite healthy and strong until they were reproduced. The tarsal margin, after their removal, appeared studded with a number of very minute apertures, as though the part had been pricked with a fine needle—these apertures existed in the centre of a little eminence or papilla. On raising the lid from the globe, the hairs, prior to their extraction, appeared to grow in a straight line, and not to touch the eye-ball: on this account, I endeavoured to relieve the defect by excising a portion of the palpebral integument; but when the hairs grew again they appeared to have taken a new direction, and to turn their concave bend towards the eye-ball—assuming, in fact, a direction precisely the reverse of that which is taken by the natural cilia. I am now about to excise the tarsal margin, which, of course, will relieve the defect.

the strength of the common cilia. MR. GUTHRIE removed from an infant, three hairs, growing from the conjunctiva near to its reflection from the eye to its external angle. The bulbous roots of these hairs congregated together, and formed a small tumour, which was easily seized by the forceps, and cut out by the scissors. It was congenital and gave rise to symptoms resembling those of entropium. MR. MACKENZIE says, that he "once met with an eye-lash, fully an inch long, soft and woolly, in a patient who had long suffered from ophthalmia." Cases of a somewhat similar kind are mentioned by MR. GIBSON and MR. WARDROP.

CASE.—A young man, a servant of a chemist in this town, has a small excrescence of the left eye, arising partly from the cornea and partly from the sclerotica; it has a white, smooth, and convex surface. There is a small depression in its centre from which several strong black hairs arise, which incline downwards so as to hang over the lower lid. The tumour is firm to the touch and densely opaque, and appears to be covered by the sclerotic conjunctiva; the surrounding cornea and sclerotica preserve their normal structure. He says that the defect was born with him, and that "the hairs began to plague him only a few years ago."

This man calls upon me to have the hairs extracted about every six weeks. In this case the tumour has an equal origin from the cornea and sclerotica—it is formed as it were equally at the expence of both textures; it is extremely firm to the touch; it has increased with the growth of other parts of the body; the hairs did not produce inconvenience until the period of puberty; they are of the same colour and have the same curve or inclination as those of the lower eye-lid.

I have removed fine hairs on several occasions growing from some part or other of the conjunctiva in a manner so as to cause a good deal of irritation, but they almost always reappear unless something be done to destroy the hair capsule.

*Treatment.*—When trichiasis arises from any form of ophthalmia, from tinea or lippitudo, or from any accident to the tarsal margin, the method of cure is merged into the treatment of the particular disease from which it may have arisen; in like manner when it is merely connected with entropium, the inversion of the cilia is cured by removing the inversion of the palpebral margin. When one or two eye-lashes only are directed towards the eye, it is sometimes difficult to detect them, for, they are generally placed quite towards the inner border of the tarsal margin, they are light coloured, small, and delicate; in every instance, therefore, where there is reason to suspect their presence, and where they are not visible on an ordinary inspection of the part, it should be examined by the aid of a double convex glass; by drawing the eyelid away from the globe; and by looking closely at the tarsal margin in various ways; and by the help of different degrees of light. And if only two or three of these misdirected eye-lashes exist, and the irritation they excite is very slight, it is scarcely necessary to advise the performance of any surgical operation for their removal. But, on the contrary, if the improperly directed eye-lashes, though few in number, excite great irritation, it would be necessary, after having extracted them without permanent advantage on several previous occasions, to apply the nitrate of silver to their capsules, first puncturing the part with a sharp pointed instrument, so as to be enabled to direct the caustic to its precise situation. In more inveterate cases where the eye-lashes grow, in what is rather improperly called a double row, the tarsal margin may be excised, as was recommended for the cure of one of the inveterate forms of entropium. I do not mean to say, that where only a few eye-lashes grow inwards, and their faulty direction cannot be remedied, that the excision of the tarsal margin would be absolutely required, for I think the destruction of their bulbs in the manner just mentioned would be preferable; and again, where a cluster of them existed, so as to render the destruction of their capsules a very tedious, if not an impracticable measure, it would not be necessary to remove the whole of the tarsal border, but merely to make two somewhat oblique incisions in the eye-lid, which shall meet at a point, and include the diseased cilia,—the V incision (its wide part being directed towards the ciliary border) on a very small scale.

The cilia which grow irregularly from various parts of the conjunctiva, are cured, or the mischief they occasion is relieved, according to their number, their size, and the situation in which they are placed, either by evulsion, by the application of caustic to, or by the excision of, their capsules.

## SECTION XIV.—MADAROSIS.

The eye-brows and eye-lashes sometimes disappear without any appreciable disease of the parts whence they naturally proceed, but it more commonly happens that they are lost from tinea, or some form of cutaneous eruption. When madarosis results from neglected tinea and lippitudo, the loss of eye-lashes, though extensive, does not usually involve the destruction of all of them,—a few straggling hairs generally remain. But madarosis is sometimes so complete that the eye-lashes and eye-brows wholly disappear and a general state of alopecia exists. I saw a man some time ago (John SHELDON, a collier, residing at Tipton,) who, in consequence of an attack of fever, had been under the care of MR. SCHOFIELD, an experienced surgeon residing a few miles from Birmingham. On his recovery the hair of the head, and of almost every part of the body, fell off; when I saw him, a few weak, light-coloured hairs, grew from the Schneiderian membrane, but they were but loosely attached to it, and were gradually falling out. The other parts of the body were totally deprived of hair. The tarsal margin was smooth, but neither more angular nor more rounded than in its normal state. I have seen two other cases of the same description, and in none of them was there the slightest appearance of disease or alteration in the figure of the tarsal margin. For some time after the eye-lashes were lost, the patients suffered from photophobia in a very great degree, and all of them became gradually amaurotic, not completely, but to an extent which prevented them from following the employment by which they had previously earned their subsistence.

When madarosis is caused by tinea and lippitudo, its treatment will be that of the disease of which it is a symptom and effect; but when it exists in connexion with the total loss of the hair in every other part of the body, I am not aware that it is ever benefited—it has certainly never been amended under my observation. As a means of protecting the eyes from the baneful effect of bright light, and of preventing the occurrence of amaurosis, it is adviseable to explain to those who may be suffering from the disease, the importance of not employing the eyes in any way requiring minute vision, in fact, they should be directed to economize their powers in every possible way; it is of consequence to tell them to avoid using them in any way requiring minute vision, by candle or gas-light, and to wear a pair of spectacles, the glasses of which are stained of a faint blue colour.*

### SECTION XV.—PALSY OF THE ORBICULARIS PALPEBRARUM.

When the orbicularis palpebrarum is palsied, the lids are incompletely closed, and there exists great irritability of the eye, epiphora, and stillicidium lachrymarum; and these effects will vary in degree in accordance with the complete or incomplete character of the paralytic affection of this muscle. In such a case the condition of the nervous system generally should be carefully examined, and the state of the portio dura of the seventh pair of cerebral nerves, from which this muscle derives its nervous supply, should be particularly investigated. This disease is, by no means, one of frequent occurrence, but, in every case I have witnessed, other muscles of the face were simultaneously affected. Where there is, simply, an atony or impaired energy of the portio dura, the effect of repeated blisters, placed as near to the stylo-mastoid foramen as possible, may be tried, moxas in the same situation may be had recourse to, and also the use of electricity. The application of strychnine, dusted upon a blistered surface in the neighbourhood of the trunk of the portio dura has been useful under my observation. When the affection depends on more serious injury, such as disease of the brain, the case is one of a most momentous nature, and the removal of the defect of the orbicularis muscle is a matter of very secondary importance. Such cases rarely come under our care, and when we are called upon to undertake their management, we are very seldom able to cure them. I do not mean to speak of atony of the portio dura as being the sole pathological condition of that nerve which may cause palsy of the orbicular muscle of the eye-lid; other of the morbid affections to which nervous texture is liable may produce it, and before the plan of treatment is determined upon, the particular disease should be ascertained, or, at all events, attention should be directed to that point of investigation.

---

* Ancient writers on diseases of the eye merely mention madarosis as a sequel of manifest disease of the tarsal margins. The applications they recommended were such as they believed to "haue force and vertue to make haire grow." AVICENNA mentions, among the best and most agreeable of them,—*mice-dung*.

An inability to close the eye-lids (lagophthalmos) is sometimes caused by spasm of the levator palpebræ, by rigidity or loss of the palpebral integument, by congenital shortness of the upper eye-lid, &c.

## SECTION XVI.—PTOSIS.*

When the upper eye-lid droops, and nearly covers the surface of the eye, the patient being unable to raise it by means of the levator muscle, but able to do so by pressing it upwards with the finger, the disease, which this condition of things involves, is termed ptosis. The existence of this malady is attended with several serious disadvantages:—it produces a considerable personal blemish, and either renders the eye useless, or causes the patient to experience double vision. It may be, and often is, combined with disease of the muscles of the globe, and particularly with paralysis of those other muscles, which receive their nervous supply from the motor nerve. It is sometimes a symptom of disease of the brain, and is so far important, inasmuch as it may anticipate, and give notice of its approach—it may form, as it were, a precursory symptom of the cerebral affection.

---

* Palpebræ superioris casus.—Imbecillitas palpebrarum.—Ptosis palpebræ superioris.—Blepharoplegia.—Blepharoptosis.

There is a form of ptosis which may be termed mechanical, and it proceeds from a thickening and enlargement of the eye-lid from chronic inflammation; or from excessive relaxation of the palpebral integument in consequence of repeated infiltration of its serous texture. And, in each of these instances, it will be noticed that the muscle is not paralysed, but that its strength is insufficient to elevate the enlarged or relaxed eye-lid. If the patient be directed to endeavour, as much as possible, to raise the lid, we observe that the muscle quivers, and that the lid is moved, and we may detect the twitching of the lid——the result of the action of the muscle—most distinctly by placing the finger upon the part. Here is a most important distinction in the pathology of ptosis; and these two forms of it are usually termed, the mechanical and the nervous ptosis—the former consisting of an increase of the part to be moved, without any proportionate increase of the strength and force of the moving power; the other, comprising a paralytic condition of that muscle on which the elevation of the eye-lid depends.

The levator muscle may sink into a state of atrophy, and may be, from that cause, inadequate to raise the part into which it is inserted; and in this case also there will be an attempt, on the part of the levator muscle, to effect the elevation of the lid; which attempt will be more or less evident as the atrophic state of the muscle may be more or less considerable. There is a state of paralysis of the levator muscle—a decidedly paralytic affection of the part—proceeding from impairment of its nervous supply, which is very seldom confined to the levator muscle alone, and this is too often, but one of many untoward symptoms which are present: for example, such a state is sometimes the sequel of apoplexy, a consequence of fever, or of severe blows upon the head, and other forms either of accident or disease which exert a paralysing influence upon the brain. In a powerless state of the muscular system, such as exists during perfect sleep, coma, and the extremest degree of intoxication, the eye-lid droops, and there is, for the time, a state of ptosis present, which is immediately dependent on a suspension of the energy of the nerve supplying the levator muscle, and, of course, remotely dependent on the torpor of the sensorium. I mention this familiar instance of the drooping of the lid, merely to illustrate my statement in reference to the dependence of ptosis on various conditions of the brain.

In the last series of the causes of ptosis, there is not noticed any attempt on the part of the muscle to elevate the lid, that is, when the paralysis is complete;—it is quite powerless, the lid sinks by its own gravity, as far as it is usually depressed when sleeping. I have several times observed that ptosis has occurred after a wound above the eye-brow, or laceration of the eye-lid, unconnected with any appreciable thickening of the part.* I have also had under my care several persons who have suffered from a sort of periodical drooping of the eye-lid, dependent, as it has appeared to me, on gastric derangement acting on the brain. Congenital drooping of the eye-lid, in a more or less complete form, has been presented to my notice on many occasions.†

---

* PLATNER appears to have witnessed this accident very frequently. See his remarks on the "palpebræ superioris casus" in *Institutiones chirurgiæ*, § 578.

† A surgeon in the neighbourhood of Birmingham, one of the best informed medical men I am acquainted with, but, unfortunately for himself, residing in a place where his abilities are inadequately appreciated, suffers from this form of ptosis very manifestly.

*Treatment.*—In treating the first form of ptosis I have mentioned, that arising from a thickened and enlarged, or a relaxed state of the eye-lid, the chief object to be kept in view is, of course, in the former case, to diminish the weight and magnitude of the palpebra, so as to adapt the volume and weight of the part to be moved, to the force of the moving power, and, in the latter case, to lessen the quantity of the palpebral integument. To accomplish the first object, the effect of mercurial and iodine preparations may be tried in the form of ointment, which may be rubbed into the thickened part two or three times a day, as the state of the skin will allow. I have in this way cured many cases of partial ptosis, consequent on long continued scrofulous ophthalmia, which has produced a thickened and hypertrophied state of the upper lid, in which the palpebral integument and its subjacent cellular membrane have, by far, the greatest share. If these means fail, a portion of the palpebral integument may be raised, with the entropium forceps, and cut away; taking care not to remove any part of the fibres of the levator muscle, which would have a tendency to aggravate and confirm, rather than diminish, the malady. When the muscle is in a state of atrophy the same operation may be performed, if the effect of blisters, applied immediately over the eye-brow, electricity, acupuncture, and the use of strychnia,* have been fruitlessly tried. If the excision of the integument does not materially relieve the defect, another method has been advised. The following is the description of the mode of performing the operation, given by the gentleman who first proposed it:—"The operation is performed by dissecting off a fold of integument from the eye-lid, and the difference, from the usual way of proceeding, consists in the portion removed. The upper incision is made immediately below the line of hairs forming the eye-brow, and extends each way to a point opposite the commissure of the eye-lids. In making the lower incision no precise direction can be given. It should approach within a short distance of the tarsal margin, varying in the extent of the portion included between the two incisions, according to the greater or less degree of relaxation of the skin, which is different in any two individuals, and it should meet the upper incision at both extremities. When the intervening portion has been detached, the divided edges should be accurately united by at least three sutures, and the wound dressed in the usual manner."*

---

* There can be no doubt that in many cases of ptosis, dependent on "nervous paralysis" of the levator palpebræ, the local application of strychnia is extremely serviceable. I had stated this fact about five years when Dr. Bardsley says "I wish particularly to direct the attention of profession to the external application of strychnia in that obstinate form of paralysis of the levator palpebræ superioris muscle, occasioning the drooping or falling of the upper eye-lid. I have met with three examples of this kind, in which strychnia sprinkled on a blistered surface, established immediately above the orbit of the eye, has been productive of great benefit." (*Transactions of the Provincial Association*, Vol. ii. p. 237.) When the Doctor made this statement, it appears that he had never tried the effect of either the external application, or the

I do not see that this operation really differs in principle, nor the effect of it in its *modus agendi*, from that generally practised; for, in each case we remove a portion

---

internal exhibition, of strychnia, as a means of curing amaurosis, a disease in which the good effects of that medicine are much more decided, frequent, and manifest. It is surprising that so zealous and enlightened a cultivator of medical science (and particularly of its therapeutical department) as DR. BARDSLEY, should have neglected to employ a new remedy for the cure of a disease in which its utility was satisfactorily established, and make use of it for the relief of one of a less consequential character, (for, unlike amaurosis, ptosis seldom affects both organs) in which its usefulness, though known, was found to be far less extensive and complete. My own experience, obtained and published years before DR. B. referred to the subject, compels me to say, that the external application of strychnia, as a means of relieving atonic ptosis, is far more efficacious when the raw surface to which it is applied exists just in front of the ear, than when it is placed above the eye-brow.

* *North of England Journal*, Vol. i.

of the skin of the eye-lid, but, in this newly-discovered mode, it is said that we render the lower part of the palpebral integument more immediately subservient to the influence of the occipito-frontalis muscle, than by merely removing an elliptical portion of it near to the tarsal margin, in the ordinary manner. I have fairly tried the operation, as described and recommended by **Mr. Hunt**, and the result of such trial has disposed me to return to the mode of operating I had previously adopted; which, as being less extensive and painful, is to be preferred, unless the more elaborate operation comprehend advantages not connected with the removal of an elliptical portion of the palpebral integument. There are, however, one or two precautions to be borne in mind, when operating for ptosis by removing an elliptical portion of the palpebral integument. If the skin of the eye-lid be removed too near to its tarsal margin, ectropium will be much more likely to be produced, than if it were removed nearer to the eye-brow, and the removal of the skin in that situation will not exert a more beneficial influence upon the disease. I always, therefore, remove the skin from that part of the palpebra which is situated immediately over and behind the orbital margin of the tarsal cartilage. And, again, if great care be not taken in properly raising the integument to be excised, some of the fibres of the muscle may be snipped away, which, itself, may be sufficient to perpetuate the ptosis, for, we have many cases related in which drooping of the eye-lid has been produced by a loss of some of the fibres of the levator palpebrarum, either by accident, or from the removal of a tumour in its neighbourhood.

Ptosis dependent on mere relaxation of the palpebral integument is readily relieved by the excision of a portion of the relaxed skin.

Ptosis arising from decided paralysis of the levator muscle is rarely cured, and, as I have already explained, it is generally connected with other mischief of a more important character. It is said, that when existing alone, probably from some injury to, or pressure upon, that branch of the motor nerve which passes to it, it may be cured by substituting the action of the occipito-frontalis for that of the levator palpebræ, but I am afraid that the chances of relief are exceedingly slight. If a person be labouring under paralytic ptosis, and be not suffering at the same time from any cerebral affection which forbids the employment of any of the following measures, they may be tried under the succeeding regulations, and in the following order.

*Ptosis consequent on fever.*—The internal administration of mercury:—blisters to the temples and in front of the ear:—electricity:—and the external use of strychnine.

*Paralytic ptosis unconnected with any obvious disease of the brain.*—Acupuncture:—blisters to the temple, in front of the ear, and above the eye-brow:—electricity:—the local use of strychnine.

I shall not enter upon the consideration of ptosis produced by the existence of tumours in the orbit, or on various parts of the face; disease of the bones of the orbit; enlargement of, or malignant disease of, the eye-ball; for, the treatment will in these cases be varied so much by circumstances, that it is quite impossible to confine it to any fixed rules. Instruments have been invented for the purpose of keeping the eye-lid elevated during the day, and thus obviating the defects the ptosis constitutes; but setting aside the difficulty of obtaining any contrivance which will effect this object completely, the unpleasantness and inconvenience of wearing it, and the resistance it would afford to the closure of the lids—to natural nictitation—so necessary for the relief of the eye, and for the distinctness of vision, would more than counterbalance any benefit resulting from its use. Such instruments are, therefore, much less used now than they were formerly, indeed, they are almost entirely discarded from modern practice.

Case.—*Paralytic ptosis much relieved by the use of strychnia.*—An elderly woman, residing in the neighbourhood of Stourport, had experienced great uneasiness on account of the death of her husband. On awaking one morning she found herself unable to raise the upper lid of the left eye. She suffered, at the same time, from pain in the head, which was still greater the day before the occurrence of ptosis. She was weak, and pale, and delicate, with a remarkably feeble pulse. She was troubled with double vision, but there was not observed the slightest strabismus. On placing the finger very gently upon the eye-lid and desiring her to try to raise it, it was very slightly indeed elevated, and a feeble effect on the part of the levator muscle was perceptible. After having tried, for an entire month, various means for the relief of this defect without the slightest advantage, I passed a few threads through the skin close to, and immediately in front of, the ear of the affected side, and dressed the seton daily, at first with only the sixth of a grain, and by degrees an entire grain of strychnia, merely mixing it with a little flour. The ptosis was soon relieved, but it was necessary to place upon the moistened threads a grain and a half of the remedy every day before a complete cure was effected. I do not mention the other parts of the treatment conceiving that they were comparatively very unimportant.

I have seen several cases of ptosis such as this where the disease has occurred, either slowly or rapidly, from grief or anxiety in old feeble persons, and where no other part of the muscular apparatus of the eye has appeared to be affected in any detectable degree.

## SECTION XVII.—TWITCHING OR QUIVERING AND SPASM OF THE EYE-LIDS.

TWITCHING OR QUIVERING OF THE EYE-LIDS.—We sometimes observe a twitching or quivering of the lids, which the subjects of this unpleasant defect are extremely desirous of having removed, although it is not productive of any impairment of vision. It may or may not be attended with a slight spasmodic action of some of the muscles of the face, and, when so associated, the defect is proportionately increased, so that when the action of these irritable muscles is unusually great, the angle of the mouth on the affected side will be drawn upwards, and the countenance will be singularly distorted. The defect is almost always connected with some nervous derangement, and, accordingly, the quivering motion of the eye-lid is materially influenced by the condition of the health and the state of the mind. If any additional impairment of health, or derangement of the alimentary canal supervene on its ordinary states, or, if the mind be greatly or painfully exercised, the muscular defect is increased in a corresponding degree. Various morbid affections and conditions of irritation of either the motor oculi; the branches of the fifth pair which are distributed to the integuments of the face; or of the portio dura of the seventh pair, may cause this quivering or twitching of the eye-lids, and it may be merely a symptom of impairment of the nervous system generally, or of derangement of the alimentary canal. In the latter case, the patient may be directed to take every other night five grains of blue pill, and once or twice during the day, a wine-glass full of some tonic mixture;* and, at the same time, we may prescribe a regulated diet, such as the circumstances of the case may require. It may sometimes be necessary to apply repeated blisters over the eye-brows, and to foment the lids with some warm narcotic application, such as a decoction of poppies or an aqueous solution of opium, and we may, at all events, quiet these unpleasant movements, for a certain space of time, by applying the extract of belladonna to the unbroken skin around the lids. I believe it will be generally found that attention to the diet, and the employment of measures which are calculated to improve the general health are, of all means, those best suited to calm these unpleasant movements of the lids, and are more generally followed by success, than a plan of treatment consisting chiefly or solely of local applications.

Spasm of the eye-lids.—The orbicularis palpebrarum may become spasmodic in its action, and when it does become so affected, it will be observed that the eye-lids are forcibly closed,—the muscle which surrounds their margin is, in fact, in violent action, and is thus rendered prominent and distinct. The effect produced upon the eye is such as would necessarily result from powerful compression of that organ: it seems forced, as it were, against its muscles behind, and the globe is thus compressed in front by the orbicularis, and behind by the recti muscles.

---

* The following is also a very useful form of alterative medicine:—

℞ Pil. Hydr-submur. Comp. ʒss
Extracti Sarsæ ʒii
Extracti Taraxaci ʒi
Saponis Castil. ℈ij Misce.

Fiat massa in pilulas 60 dividenda è quibus duæ ter in die sumantur.

This spasmodic action of the orbicularis muscle of the eye-lid is generally produced by an increased sensibility of the retina to light; and takes place for the purpose of accurately closing the lids and thus rendering them incapable of transmitting more than the slightest portion of it; whereas, when the eye-lids are simply extended in front of the eye by the moderate action of the orbicularis muscle, a certain portion of light is transmitted through their texture, a much larger portion of it, certainly, than is capable of gaining admission to the posterior textures of the eye, when the eye-lids are forcibly brought together by the spasmodic action of the orbicularis muscle, which not only closes the part more perfectly, but renders the lids thicker, and induces a somewhat constrained action of neighbouring muscles, whereby, the orbit is, as it were, overhung by the surrounding integument. An eye-lash may turn inwards and give rise to spasm of the lids, and I should recommend that the state of the tarsal margin be most carefully examined, in every case of this description, in reference to the existence of one or more inverted cilia—a foreign body beneath the eye-lid or upon the surface of the eye—a conjunctival tumour, &c. Lastly, various nervous affections may give rise to blepharospasmus, of which the undue action of the orbicularis palpebrarum may be merely a part of many similar symptoms.

In treating the spasmodic affection of the orbicularis palpebrarum which arises in consequence of an increased sensibility of the retina, the remedial measures are found to merge into the proper management of the photophobia and its causes. In treating that form of blepharospasmus which is dependent on a manifest external source of irritation, such, for example, as the inversion of one or more of the eye-lashes, we have only to extract the misdirected cilia, and employ the usual means of preventing their reproduction, or to adopt the customary means of palliating or removing any other source of irritation on which the spasm of the eye-lids may depend. That form of blepharospasmus which arises from disorder of the digestive organs, is cured by the measures which are adapted to the removal of the particular derangement of the alimentary canal. And finally, when a spasmodic action of the orbicularis palpebrarum is produced by some disorder or disease of the nervous system, the proper mode of removing such disorder or disease of the particular part of that system so deranged, will occupy the attention, and will comprise, at the same time, the treatment of the blepharospasmus.

### SECTION XVIII.—MORBID NICTITATION.*

Winking or nictitation is accomplished, in the human subject, by the contraction of the orbicularis palpebrarum, and is frequently performed in the natural and healthy state of parts, for the purpose of diffusing the tears equally and completely over the anterior surface of the eye. And this motion is effected with so much ease and facility, that we are frequently unacquainted with the occurrence —we are often unconscious of the act of natural nictitation, unless our attention be particularly directed to it, or unless it be accomplished with unusual violence. We observe that some persons are "winking," as it is termed, very frequently, and it is very unpleasant to them as well as to bystanders, and, if they are aware that it renders them the object of notice or impertinent remark, the defect is much increased; so that this affection as well as the twitching of the lids, appears to be much influenced by the condition of the nervous system.

---

* In the preceding section I have referred to "spasm of the eye-lid," which is distinguished from "morbid nictitation," inasmuch as the latter affection appears to be nothing more than a natural action performed with greater *frequency* than usual, the former being a natural action performed with *increased power and violence*. Spasm of the eye-lids is, in fact, a much more painful, injurious, and serious disease than is the mere defect occasioned by morbid nictitation.

I do not know that this state of morbid nictitation is productive of any really injurious or important defect, and it is for the removal of the unpleasant appearance it communicates, rather than for the cure of a hurtful disease, that we are called upon to interfere. It sometimes accompanies chronic ophthalmia, epiphora, trichiasis, and some other affection of the eye or its appendages, is produced by any circumstance occasioning temporary agitation of the nervous system, and is also one of the numerous effects of impaired health and derangement of the uterine system, or of the digestive organs. I have already referred to these matters, and have, therefore, only to state that we must discover and treat the causes of the disease, which are very numerous and very various, and, on their removal, the morbid and preternaturally frequent nictitation will be remedied. As local applications, I can only recommend warm fomentations, such as a decoction of poppies, or frequent ablution with tepid water, but they are by no means essential, and are merely palliative in their operation.

## SECTION XIX.—INFLAMMATION OF THE EDGES OF THE EYE-LIDS.*

This disease appears to be, at first, nothing more than an inflammatory affection of the Meibomean glands. It is said that the inflammation, constituting ophthalmia tarsi, does not originate in the Meibomean gland itself, but in its excreting ducts; the conjunctiva at the tarsal margin; and the capsules of the cilia. It is, however, very difficult to determine this question with precision.

---

* Blepharophthalmitis glandulosa.—Ophthalmia tarsi.—Tinea tarsi.

When tinea tarsi commences there is a slight thickening of, or rather towards, the tarsal margin, with an abundant glutinous yellowish secretion—the enlargement occurring as a necessary consequence of the inflammatory state of the Meibomean glands, and the increased and altered secretion from the morbid condition of the glands which produce it. If the disease really consisted, in the first instance, of inflammation of the Meibomean ducts, we should expect, as a result of such inflammation, obstruction of their tubes, and, as a necessary consequence, diminished secretion, or, more precisely, dryness of the tarsal margin from a deficient supply of that secretion, which, in their healthy state, moistens and lubricates them; and if, on the contrary, the hair capsules were the primitive seat of the malady, we should certainly expect that the cilia would become detached, and the skin around their roots ulcerated, as one of the earliest symptoms of tinea tarsi, whereas the falling out of the eye-lashes is never a primary symptom of this disease, and often exists only when it is long continued, very severe, and has been much neglected or mismanaged.

The inflammation is not, however, confined to the Meibomean glands alone, but is propagated first to their ducts, and is thence extended to the surrounding parts of the conjunctiva, and finally implicates the capsules of the cilia and the neighbouring part of the palpebral integument.

*Symptoms.*—There is first swelling of the edges of the eye-lids, the Meibomean secretion is increased in quantity, and is converted into a yellowish and very glutinous fluid, the lower margin of the tarsus is redder than natural, and the roots of the cilia are crusted with the altered Meibomean secretion. This may be termed the first stage of ophthalmia tarsi. If no measures be taken to remove the disease, the swelling of the tarsal margin increases, that part of it where the skin of the eye-lid becomes gradually changed in its characters into those of mucous membrane, becomes very red and tumid, the Meibomean secretion becomes very glutinous and exceedingly abundant, it incrusts around the roots of the cilia, some of which are now beginning to be detached. In the progress of tinea, when the tarsal margin is raw and excoriated, the cilia are in a great measure destroyed, and the few which remain are distorted in their direction. When the disease has arrived so far, other symptoms take place; the edges of the eye-lids, having lost their equality and their adaptation to the globe of the eye, do not properly conduct the tears towards the lachrymal puncta, they are not conveyed away with sufficient rapidity, but accumulate and overflow upon the cheek. There is also some degree of inflammation of the eye present, and more or less irritation of the skin upon which the tears flow. The Meibomean secretion collects in large quantity during the night, and when the patient first awakes he cannot separate the eye-lids—they are firmly glued together by the morbid discharge, and any attempt to open them by the agency of the muscles of the palpebræ occasions great pain, and, if persevered in, is only successful after having produced much suffering, torn away many of the cilia, and probably caused the parts to bleed. At this period there may take place various additional symptoms; ulceration of the edges of the eye-lids may occur, and may occasion many unpleasant effects, which no measures we may adopt will entirely remove:—1, In the first place, the hair capsules may be totally destroyed, or almost entirely destroyed, so that the lids are permanently deprived of their due quantity of eye-lashes;—2, the tarsal margin may be rendered irregular, so that the cilia are distorted in their direction, and many of them forced against the globe; or the edge of the eye-lid may be rendered thicker and harder than it ought to be, without being everted, forming, what is sometimes described as a distinct disease under the name of callosity of the tarsal margin (tylosis), its angles being, at the same time, removed, so that the margin of the palpebra is thick, hard, and rounded; sometimes, also, it is white and smooth at the same time, but, instead of this, its vascularity may be increased, its margin may be ulcerated or fissured, and this condition of disease is very difficult of removal;—3, the Meibomean follicles may become obliterated, and, of course, the Meibomean secretion will be then exceedingly scanty, or, if the whole of them be obliterated, it will cease altogether; and at the same time that this change occurs, the Meibomean glands will, in consequence of the severe and prolonged inflammation they have sustained, have their secreting properties destroyed;—4, lippitudo may be produced by long continued and severe tinea;—5, ectropium in a more or less severe degree, may be caused by the continuance of tinea, either by rendering the cutaneous surface of the eye-lid rigid and diseased, or by thickening the conjunctiva and causing copious deposition beneath it—which becomes organized;—6, the eye may be rendered permanently irritable and weak, and incurable madarosis may be established.

*Causes.*—When ophthalmia tarsi originates in an inflammatory state of the Meibomean glands, such inflammation is often excited by disturbance of the digestive organs, or some faulty state of the general health, which is prone to excite derangement of glandular structures generally, hence we find ophthalmia tarsi not infrequently connected with scrofula in children; but when it is produced by an inflammatory state of the Meibomean apertures and ducts, it is generally excited by some previously existing inflammation of the eye, and particularly when that inflammation is excited by an eruptive state of the skin, such as attends measles, small-pox, and scarlatina. Ophthalmia tarsi, is, in this instance, a form of inflammation which spreads merely from continuity of surface, for, of course, when the conjunctiva is inflamed, those parts which partake of its characters, and are continuous with its surface, may also become inflamed. In both instances, which ever may be the part primarily affected, the inflammation generally extends by degrees to all those parts I have formerly mentioned as implicated in the fully established tinea tarsi—namely, the Meibomean glands, the Meibomean ducts, the conjunctiva at the tarsal margin, the capsules of the cilia, and the neighbouring part of the palpebral integument.

*Treatment.*—When pointing out the symptoms of ophthalmia tarsi, I stated that one of the earliest indications of this disease was an increase and a modification of the Meibomean secretion, I represented that it became incrusted around the roots of the eye-lashes, and that when the subject of the malady first awoke in a morning, he found it to be quite impossible to separate the lids, by muscular effort, without producing much pain, and inflicting great injury upon the part. To prevent this, I request the patient to smear upon the border of the eye-lids, every evening, a little mild ointment, which has the effect of lessening the inflammation, diminishing the quantity and improving the quality of the Meibomean secretion, and preventing the adhesion of the palpebræ, which is so painful and injurious. In addition, the patient should be requested to bathe the eyes every morning with a little warm milk and water, until the discharge, which still remains attached, is so far softened as to be removed—drawn through the eye-lashes—pretty readily by the assistance of a well made pair of forceps, which are rather broad at their extremity; for, if it be allowed to remain, it will eventually lead to ulceration.

2.—As there is a certain degree of inflammation present, I usually recommend the application of leeches around the eye-lids, and, if the conjunctiva is much inflamed, I scarify it pretty freely, and I also direct the patient to apply a blister at the back of the neck, or one behind each of the ears.

3.—As the state of the constitution is generally far from being healthy, I also put the patient upon some plan of treatment which is calculated to remove the faulty state of his constitution, whatever may be its nature, and direct him to pay every attention to the state of his bowels, and prescribe such rules for the management of the diet, as the particular circumstances of the case may determine. When ophthalmia tarsi occurs in delicate scrofulous children, the administration of the sulphate of quina may often be advantageously combined with the use of any local remedies it may be judged expedient to employ.

4.—During the day the eyes should be frequently bathed with a little warm goulard lotion, or tepid water, and the unguentum plumbi should be carefully smeared along the tarsal margins, and particularly in the evening, immediately before going to bed. When this ointment has been used for three or four days, we may then employ one of a more stimulating quality, and that I prefer is composed of one part of the *unguentum hydraryri nitratis*, and two or more of *unguentum cetacei*, intimately blended, and rubbed down very carefully. In using this ointment, great care is requisite, for, on the mode of applying it, depends its capacity to produce a good or an ill effect. Direct the patient's nurse to place a little of the ointment upon the point of the finger, and to rub it rapidly upon the palm of the hand until it becomes quite liquid, and if any small knots or lumps are contained in it they are to be picked away, so that the ointment shall be quite smooth—perfectly equable; the point of a fine camel-hair pencil is then to be dipped into the liquid unguent and carefully drawn along the margin of each eye-lid. Before smearing the ointment upon the tarsal margin it must be everted so as to remove it from the surface of the eye-ball, and, in using the ointment, care must be taken not to touch the globe, and only to smear upon the diseased part of the palpebral margin, a small quantity of it, in an equal and uniform manner. If we neglect to explain to the parents or friends of children who are suffering from ophthalmia tarsi the mode in which the ointment should be used, they will probably allow the Meibomean secretion to incrust upon the tarsal margin, and will fancy they have fully complied with the "Doctor's" directions when they have smeared a quantity of the ointment upon this concreted secretion, and upon some part of the skin of the eye-lid. When the *ung. plumbi* is changed for the nitrated ointment, the zinc may be also substituted for the goulard lotion.

By means such as these we may generally effect a complete cure of the disease without leaving behind any injurious effects—that is, presuming we have had an opportunity of seeing the case at a sufficiently early period. If the disease occur in connexion with scrofulous ophthalmia, it would be adviseable, in addition to the adoption of these local measures and the constitutional treatment I have recommended, to place an issue in the arm, with a view of preventing those relapses which are otherwise so likely to occur, and which, if they do take place, are apt to leave behind very injurious effects.

Sometimes ophthalmia tarsi is attended with considerable itching, and it has been then designated psorophthalmia, under an erroneous impression that the disease resembles psora in other situations.* This itchiness is best relieved by frequent ablution with tepid milk and water, by the careful removal of the incrustations which form around the roots of the cilia, and by the application of an ointment, prepared with either the white or red precipitate, to the tarsal margins.†

Whenever the disease is very acute and obstinate, it is necessary to remove all the cilia in the neighbourhood of the little pustules or incrusted ulcerations which exist at their roots. In this state of things I have found the extraction of the eye-lashes, and the slightest possible application of the lunar caustic to the raw and ulcerated edges of the eye-lid, afford much benefit;—we may, in this way, heal the ulcers, preserve the hair capsules, and diminish that thickening of the tarsal borders which is so apt to be excited by the continuance of the disease.* By the adoption of these measures we may also prevent the extension of ulceration, which would inevitably destroy the hair capsules—if, in fact, we allow the eye-lashes to become detached by the extension of ulceration, they are not afterwards formed, for the part which should produce them is destroyed by ulceration.

---

* Some modern writers, and among others MR. LAWRENCE, treat of "pediculi ciliorum;" and MR. LAWRENCE states, that they resemble "the crab lice more than those of the head." I have seen no complaint of this description: perhaps the disease may have been more frequent in former days when it was the custom to employ extraordinary remedies for the cure of ophthalmic disease:—"Some," says BANISTER in his *Breviary*, "will put a *lowse* in the eye, which is good for this cause, vsed as when the eye is dull, obscure, and dry, a *lowse* then put into the eye, tickleth and pricketh, so that it maketh the eye moist and rumaticke (full of tears), and quickeneth the spirits."

† I have found the following ointment particularly serviceable in completing the cure of ophthalmia tarsi, which has been previously relieved by the use of mild remedies.

1.—To an ounce of zinc ointment (prepared by mixing one drachm of the oxide with an ounce of lard) gradually add half a drachm of the solution of the acetate of lead, and carefully mix them together.

2.—The celebrated ointment of JANIN, consists of two drachms of Armenian bole, the same quantity of tutty, one drachm of white precipitate, and half an ounce of lard.

The following ointment is strongly recommended:—

3.—℞ Hydr. præcip. albi gr.xv
Æruginis gr.viii
Tutiæ præp.
Bol. alb. āā ℈j
Adipis ℥j Misce.

## SECTION XX.—LIPPITUDO.

Lippitudo is very often nothing more than an effect of prolonged or neglected tinea. It consists of a thickened and slightly everted state of the ciliary margin, and is preceded by, and often attended with, excoriation or ulceration of the palpebral integument near to the tarsal border.

*Symptoms.*—The ciliary margin of the eye-lid is thickened, rounded, slightly everted, and irregularly notched and nodulated, and has undergone certain changes in its anatomical qualities, and there may be ulceration of the tarsal margin, and there is always present a certain degree of excoriation of the integument, immediately behind it; there will also be a more or less considerable degree of irritation of the eye, with stillicidium lachrymarum, the conjunctiva will be redder than it ought to be, and the eye will be very liable to attacks of inflammation. This is the confirmed lippitudo which admits of relief, but which cannot be completely cured. There is a form of lippitudo, which, if neglected, eventually resembles that I have now described, in which there are present precisely similar symptoms, except that the same disorganizing changes have not yet taken place in the tarsal margin, nor are all the Meibomean ducts completely obliterated, some of them are obliterated, others are merely somewhat obstructed, but, in other respects, the diseases are pretty much the same; for there is stillicidium lachrymarum, and there is also thickening and induration, with a slight degree of eversion, of the tarsal margin, with ulceration of the palpebral integument immediately behind its ciliary border, but there is, in addition, not a dryness, but a rawness or excoriation of the tarsal margin.

---

* The slightest touch with a little nitrate of silver will be sufficient to produce all the benefits to be derived; if it be too liberally applied and applied for a long period, it may distort the tarsal margin, destroy textures too extensively, and promote the occurrence of ectropium This is far better than the old method of managing these little ulcerations as explained by PLATNER:—" Si glandulæ Meibomii exulceratæ sunt, et propter id palpebrarum cartilagines rubent, cum levi prurigine graves sunt, et noctu pituita inhærescunt; id quod sæpe post variolarum morbum fieri deprehenditur, supervacua omnis curatio est, nisi ulouscula satis fuerint purgata. Id autem fieri potest, si his temperata manu admovetur lapis infernalis." *Institutiones chirurgiæ rationalis*, § 307.

*Treatment.*—The first or inveterate form of lippitudo, requires much the same treatment as the latter variety. In both cases the indications to be fulfilled are pretty nearly alike, but in the former variety, in consequence of the total obliteration of all the Meibomean ducts from the long continuance of inflammation and ulceration, the tarsal margin can never re-acquire its absolutely healthy characters, nor can the Meibomean secretion be restored. The subject of the disease has, therefore, permanently and irretrievably lost all the good effects usually resulting from the lubricating qualities of the Meibomean secretion. If any important degree of inflammation be present, the application of leeches to the lids, of blisters behind the ears, or to the back of the neck, with warm fomentations to the eye, consisting either of tepid water or goulard lotion, will generally remove it; and when this is accomplished—when every degree of redness is taken away, or at least when the vascularity is much reduced—we have merely to heal the ulceration, if any exist, and diminish the thickening of the tarsal margin. For this purpose the eye-lids should be well bathed with warm water, so that the concreted discharge shall be cleared away, and then a little of the unguentum plumbi may be applied to the excoriated part; in a few days this may be exchanged for the zinc, or the zinc and lead ointment combined, and finally, the cure may be completed, as far as it admits of completion, by the use of the *unguentum hydrarygri nitratis*, or, if its application produces much pain, it may be diluted with an equal quantity of spermaceti ointment: the diluted nitrico-oxyd ointment is also a very useful application. When hordeolum forms during the treatment of lippitudo, it must be managed in the usual way, and if any considerable degree of thickening or callosity of the eye-lids, remain, or if the lippitudo causes ectropium, these affections will be treated in the manner previously explained.

## SECTION XXI.—ŒDEMA OF THE EYE-LIDS.

The eye-lids are sometimes œdematous, and, in consequence of the great quantity of cellular membrane which enters into their composition, they may become so excessively enlarged from serous infiltration as to cover the eye completely, and to be incapable of being separated by the action of their muscles. This state of œdema may arise from constitutional or local causes. It may exist in connexion with general anasarca, or it may arise in consequence of some local injury or ailment. In general anasarca the palpebræ are often enormously infiltrated, and in various diseases of the heart they are more or less œdematous, which is particularly evident on first rising in a morning. After scarlet fever the same thing may be remarked. Erysipelas, or chronic inflammation of the lids may give rise to œdema, and a like effect may proceed from any cause which induces an impediment to the free circulation of the part. The lids, when very œdematous, present a smooth equal surface, the swelling is semitransparent, and it will often pit on pressure. When it arises in connexion with general dropsy, or, from some morbid affection of the heart, the treatment of the local defect will be that which is necessary for the more important malady; but when it arises from erysipelas or chronic inflammation of the palpebræ, the management of the inflammatory affection of the lids will constitute the treatment of the consequent œdema; and when it takes place independently of such causes, perhaps from simple debility, or from circumstances not satisfactorily detected, slightly stimulating lotions, such as, *largely diluted* spirits of wine, may be applied to the eye-lids, and also a blister to the back of the neck, with such purgative or other medicine, as the circumstances of the case may appear to require. I have frequently removed this œdematous state of the eye-lids, when occurring, apparently, as a simple local affection, by directing the patient to bathe the eyes frequently with the *liquor ammoniæ acetatis* diluted with five times its quantity of water. If the œdema be very excessive, and do not yield to these measures, the part may be punctured with a fine needle, in one or two places; the operation being repeated as often as the fluid collects in sufficient quantity to interfere materially with vision, or produce other very great inconvenience.

### SECTION XXII.—EMPHYSEMA OF THE EYE-LIDS.

Emphysema of the eye-lids may be caused in two separate ways; either by injury to the organs of respiration, whereby the cellular tissue of the body generally is rendered emphysematous, or, by fracture or disease of the bones of the nose, or of the orbit, so that at each inspiration the eye-lids are additionally distended. These cases require only the aid of general surgery; the latter is resolved into the management of the fractured bones, and the former is merged into the treatment of the particular injury of the respiratory organs which caused the emphysema; the only treatment it may be necessary to adopt in addition, is to prevent the patient from blowing the nose forcibly during the progress of treatment, and to puncture the emphysematous lid with a fine needle, so as to relieve its degree of tension; and this operation may be repeated as frequently as may be required; the circumstances determining its necessity being, its size, its interference with vision, its condition of tension, and the degree of pain and pressure it occasions.

CASE I.—*Emphysema of the eye-lids from a blow upon the nose.*—" A young man struck his nose against a post; the integument remained unbroken, and there was but little pain or bruising. Two hours after, while making an effort to blow his nose, he felt a kind of vapour rise along the left side of the nose, and mount rapidly up the angle of the eye, thence spreading over the eye-lids. These became so much swollen as completely to interrupt vision. The patient being frightened, immediately came to the Hotel Dieu, where the affection was recognized as an infiltration of air into the cellular texture of the parts about the eye. He was bled from the arm, and compresses dipt in goulard water applied to the eye. He was quite well on the third day. Nothing was discovered on the most careful examination of the nose."*

CASE II.—*Emphysema of the eye-lids produced by disease of the nasal bones.*—"James HUTCHINS, aged 38, presented himself, with the integuments surrounding and covering the right eye swollen to the size of an orange. He stated that, on blowing his nose that morning, he felt his eye suddenly compressed, and immediately the swelling appeared: the more he continued to blow his nose, the more the compression and swelling increased. On being directed to blow his nose, the distention of the integuments and sense of compression became so painful, that he begged us, to use his own words, 'to open his eye.' On examining the parts, there did not appear to be any disease of the lachrymal sac or ducts, but the mucous membrane of the nose was loaded with a dry, unhealthy secretion; and he stated that for the last two months he had been troubled with pain in the upper part of the nose, attended with a discharge of blood and matter. The patient was admitted into the hospital, and a cold lotion ordered to the eye: the following morning the swelling had subsided, and finding it did not recur on blowing his nose, he left the hospital, and has not presented himself since."†

---

* *London Medical Gazette*, Vol. v. p. 699. Abridged from *La Lancette*.

† *Medical and Physical Journal* for April, 1829. An interesting case of emphysema of the eye-lids is mentioned in the *Lancet* for May, 1829, and also in the *Archives Générales*.

## SECTION XXIV.—CONGENITAL DEFECTS AND MALFORMATIONS OF THE EYE-LIDS.

I have several times witnessed a rigid and contracted state of the eye-lid, independently of the existence of a cicatrix, or of inflammation, or of injury to the part. Sometimes it has affected only one, and, in other instances, both the palpebræ. When it affects both eye-lids, there is a state of lagophthalmos, or shortening of the palpebræ, produced, just as though the orbicularis palpebrarum were paralysed; but when it only affects one lid, the motions of the other are perfect, and the eye-ball is pretty completely covered, particularly, if merely the lower palpebra be affected with this singular rigidity of its integument. In a few instances, it has given rise to ectropium, as the individual has advanced in life; but this occurrence is a very unusual one. There is generally a weak and watery state of the eye, and the patient is peculiarly liable to have the eye become irritable in dusty, windy weather; and the organ is singularly obnoxious to attacks of inflammation. If we carefully examine the integument, we find that it is unusually hard and firm, but that there is no other detectable defect, except perhaps that there appears to be a deficiency of its cellular membrane; for the textures of the eye-lid are much less moveable upon each other than are those of a perfectly natural and healthy palpebra. I am not acquainted with any measures which will remove this rigid condition of the eye-lid; but persons so affected find great relief from wearing a pair of the common green or blue "preservers," which are protected at the sides, so as to defend the eyes, in a great degree, from the influence of the wind, the sun, and the dust.*

---

* I am in the habit of recommending patients to wear a little fine gauze or some delicate dark coloured texture placed in an ordinary spectacle frame, instead of glasses. The light is thus rendered less

I have seen three cases in which the tarsal margins have been coherent from birth.* The defect has occurred in both eyes; the eye-lashes have not been formed, and, in the situation of the intertarsal slit, there has been a narrow sulcus, lined by a delicate vascular portion of skin, which admitted of extension, but not of absolute separation. In one of these cases the eye-ball appeared to be very imperfectly developed, for the lids were scarcely at all convex externally, neither was there any proper globe to be felt through them. In the two other examples of this malformation, the eye-ball appeared to be adequately developed, but to be firmly adherent to the globe, inasmuch as the very limited movements of which it was susceptible occasioned an evident dragging of the eye-lid. A person suffering

---

offensive to the weak and irritable eyes, they are kept cooler, and persons who have occasion to make use of some such artificial protection from light, say they are less dazzling and far more comfortable than the blue glasses.

* Banister (sec. iv. chap. x.), Heister (p. ii. sec. ii. cap. xlvii.), Chandler (*A treatise on the diseases of the eye*, p. 93), Dionis (*Cours d'operations de chirurgie*. Sixieme demonstration,) and others speak of congenital anchyloblepharon as though it were not a particularly infrequent occurrence. Beer, however, admits that it is a rare disease, but he says he has performed an operation for its removal (when congenital) with success. (*Lehre*, Vol. ii. p. 123.) Weller says, "in rare cases the disease is congenital." (Monteath's translation, Vol. i. p. 124.)—Lawrence has never witnessed congenital anchyloblepharon at all, but it has been repeatedly noticed by Ammon, Walther, and Seiler.—"Rarement cette reunion," says Wenzel, "est parfaite; il reste assez souvent un très-petit espace par lequel les larmes s'échappent de l'intérieur des paupières. J'ai cependant observé le fait contraire; et tel était l'enfant d'un capitaine de navire du port de Boulogne. Je l'opérai pendant le court séjour que je fis dans cette ville, en l'an dix. Je fus obligé de tracer une ligne entre les deux rangées de cils, avec la pointe d'un bistouri qui ne dépassait le bout des doigts qu'autant qu'il le fallait pour entamer les tégumens qui joignaient les paupières; je plongeai cette pointe plus profondément dans l'angle externe, afin de me faire jour jusqu'au globe, de pouvoir placer les ciseaux courbes et achever la séparation des organes réunis, en suivant la ligne pratiquée par le bistouri. Les deux yeux étaient dans le même état, et l'opération réussit si completèment, que deux ou trois jours après on ne voyait aucun vestige d'incision. L'opération de chaque paupière avoit cependant duré plus d'une heure, en raison des mouvemens violens exercés par le malade." *Manual de l'oculiste*, Tome ii. p. 155.

from a defect of this description, has a very solemn and repulsive appearance; but, as he is incapable of appreciating appearances, he is not likely, on that ground, to submit to a painful operation for the purpose of enabling him to wear artificial eyes. Few persons, I apprehend, having no vision of their own, will be found willing to suffer a painful operation for the purpose of pleasing that of others. This congenital defect is said, by some authors, to be very frequent: I have only seen it three times during the many years I have been in the habit of seeing a vast number of persons afflicted with ophthalmic diseases. I have never met with an instance in which the eye-lids have been adherent to the eye-ball, and not adherent to their opposing tarsal margin also.

BANISTER, and many succeeding writers, speak of a congenital malformation of the eye-lid, in which that part is cleft in its centre, in a perpendicular direction, as occurs in hare-lip. I have not seen a congenital defect of this description.

---

SEQUEL OF THE CASE OF FUNGUS HÆMATODES RELATED AT PAGE 418.—I stated that, in consequence of the opinions expressed at the consultation, I thought it prudent to defer the performance of an operation. Soon after the child's return home, the enlargement in front of the ear burst and discharged a quantity of thick healthy pus. The fungoid disease then appeared in the other eye; various nodules of medullary matter formed beneath the scalp, (namely, one in the situation of the posterior fontanelle, another over the right eye-brow, and a third above the right ear); and the child died in a horrible state of disease after having suffered an indescribable degree of torture. From an unfortunate mistake I was prevented from examining the body after the child's death. It will be noticed that the nature of the contents of the enlargement in front of the ear, and of the nodulated tumours beneath the scalp, strictly accord with the results of my previous experience as stated at page 440. I have considered the enlargements beneath the scalp to have been of a medullary nature, and not to consist of a purulent fluid, because none of them broke and discharged their contents, and, also, because they were represented to have been fimer to the touch than a simple abscess, or cavity containing pus.

# GENERAL INDEX.

- Abscess of the cornea, V. i—464
  - iris, 724
- Absorption of the choroid coat, 786
  - ciliary processes, 767
  - iris, 726
    - amaurosis consequent on, 727
  - retina, 800
- Adhesion of the eye-lid to the eye-ball, V. ii—732
- Albugo, V. i—447
- Amaurosis, age at which it most frequently appears, V. ii—252
  - causes of, 265
  - congenital, 252
  - diagnosis of, 269
  - dependent on atrophy of the retina, 247
    - atrophy and ramollissement of the optic nerve, 248, 322
    - compression, mechanical irritation, and elongation of the optic nerve, 248
    - subsclerotic and subchoroid dropsy, 247, 327, 334
    - varicosity of the vessels of the retina, 247, 329
    - various pathological conditions of the optic nerve, 248
  - from a carious tooth, 359
    - an aneurismal enlargement of the central artery of the retina, 342
    - anger, 250
    - compression of, and tumours in, the brain, 249
    - concussion of the retina, 332
    - copious salivation, 357
    - enlargement of the branches of the central artery of the retina, 341
    - enlargement of the pituitary gland, 318
    - fear, 250
    - gastric and intestinal disorder, 250
    - grief, 250
    - ossification of the ophthalmic artery, 251
    - sudden and forcible pressure upon the eye, 509
    - suppression of a customary discharge, 250, 358
    - suppuration of the optic nerve, 324
    - the irritation of dentition, 250
    - the retrocession of a cutaneous eruption, 250
    - uterine affections, 250
  - hereditary predisposition to, 253
  - illustrations of many of its forms, 312
  - prognosis of, 273
  - progress of, 264
  - symptoms of, 256
  - treatment of, when arising from mental emotions, 299
    - caused by debility of the system, or atony of the retina, 280
    - dependent on various deranged states of the alimentary canal, and of the uterine system, 297
    - determined by compression of the brain, 305
    - induced by the pressure of a fluid either upon the concave or convex surface of the retina, 294

Amaurosis, treatment of, when occasioned by an enlarged and atonic condition of the vessels of the choroid and retina, 291
occurring from laceration or division of the supra or infra-orbitary branches of the fifth pair of nerves, 309
originating in various morbid changes in the retina and optic nerve, 305
periodical, 303
proceeding from the sudden exposure of the eye to vivid light, 301
produced by general plethora, by determination of blood to the head, or by chronic retinitis, 276
use of strychnia in, 282
varieties of, 244
Anchyloblepharon, congenital, 842
traumatic, 730
Aneurism by anastomosis of the eye-lids, 781
in the orbit, 618
of the central artery of the retina causing amaurosis, 342
ophthalmic artery, 627
Anterior operation of solution, 153
Aqueous and vitreous humors, dropsy of, 484
humor, dropsy of, 476
inflammation of the membrane of, V. i—583
mode of evacuating the, 85, 595
Arcus senilis, 455
Arteria centralis retinæ, enlargement of, V. ii—342, V. i—798
Artificial eye, mode of introducing, V. ii—521
pupil, method of operating for the formation of, V. i—732
Atresia iridis, 632, 729
Atrophy of the cornea, 545
eye-ball, V. ii—494
lachrymal caruncle, 553
gland, 646
muscles of the eye-ball, 572
retina, V. i—800

Blenorrhœa chronic, of the lachrymal sac, V. ii—689
Blepharophthalmitis glandulosa, 815
Blepharoplegia, 815
Blepharoptosis, 815
Blepharospasmus, 824
Brain, various pathological conditions of, causing amaurosis, 249

Cancer of the eye-lids, V. ii—737
Cancerous ulceration of the lachrymal caruncle, 551
Capsule of the lens, dropsy of, 36
inflammation of, 32
causes of, 38
effects of, 36
symptoms of, 33
treatment of, 38
opacity of, 36
thickening of, 36
Carbuncle of the eye, V. i—425
Caries of the os unguis, V. ii—701
Caruncula lachrymalis, cancerous ulceration of, 549
enlargement of, 549
inflammation of, 543
Cataract,
anterior capsular, 81
capsulo-lenticular, 86

Cataract, caseous, 58
    causes of, 58
    classification of, 80
    colour of, 58
    common capsulo-lenticular, 87
    compound, 58
    confirmed, 58
    congenital, 61
    cystic capsulo-lenticular, 88
    definition of, 56
    diagnosis of, 64
    does it occur from inflammation of the lens? 41
    false, 190
    fluid, 58
    general symptoms of, 75
    genuine, 56
    glasses, 200
    hard, 58
    hereditary predisposition to, 61
    immature, 58
    incipient, 58
    lenticular, 84
    lymphatic, 193
    mature, 58
    means of distinguishing hard from soft, 93
    measures to be adopted during its progress for the purpose of assisting vision, 96
    milky, 58
    Morgagnian, 92
    operations for the cure of, 125
        upon infants, 176
    pigmentous, 191
    posterior capsular, 83
    prognosis of, 69
    progress of, 70
    purulent, 194
    removal of, by an incision in the sclerotica, 198
    result of operations for, 121
    sanguineous, 190
    simple, 58
    soft, 58
    spurious, 56
    treatment of, 99
    true primary, 81
    true secondary, 184
Chemosis, V. i—60, 180
        its causes, objects of its formation, and treatment, 61, 207
        opinions of Banister, Astruc, Sauvages, Ware, Wenzel, Travers, and Scarpa, respecting, 59
        varieties of, 60
Cholera, inflammation of the eye produced by, V. ii—527
Choroid coat, absorption of, V. i—786
    congenital absence of, 786
    inflammation of, 772
        causes of, 780
        diagnosis of, 778
        effects of, 777
        prognosis of, 780
        treatment of, 781
    ossification of, 786
        the vessels of, 787
    staphyloma of, 503
  pigment, absence of, 785

Choroid pigment, diminution of, a cause of amaurosis, V. ii—247, 261, V. i—786
variations in its colour and quantity, V. i—786
Ciliary body, chronic inflammation of, 768
enlargement of, 769
ligament, peculiar growth attached to, 613, 767
processes, absorption of, 767
inflammation of, 767
morbid adhesions of, 767
Coloured vision, V. ii—234, 236
Colours, various visual defects in reference to, 234
Concretion of the tarsal margins, 730, 842
Congenital anchyloblepharon, 842
growths from the cornea, V. i—539
perpendicular cleft in the eye-lid, V. ii—843
Conical cornea, V. i—526
treatment of, by astringents and stimulants, 535
constitutional remedies, 534
emetics, 538
evacuation of the aqueous humor, 534
removal of the lens, 535
Conjunctiva, burns and scalds of, 402
chronic inflammation of, 327
contusion of, 406
cuticular, 363
foreign bodies upon, within, or beneath, 334, 413
former and present mode of scarifying, 70
fungous state of, 350
fungous excrescences from, 120, 391
granular state of, 343
effects of, upon the cornea, 352
varieties of the disease so designated, 343
hairs growing from various parts of, V. ii—809
laceration of, V. i—411
mode of removing foreign bodies from, 417
relaxation of, 421
remarks on its anatomy and physiology, 39
simple acute inflammation of, 41
varieties of the pustules which form on the, 222
watery cists beneath, V. ii—769
Conjunctival secretion, altered state of, V. i—398
Cornea, abscess of, 464
adipose depositions near, 389
and sclerotica, malformation of, V. ii—810
atrophy of, V. i—545
congenital growths from, 539
conical, 526
contusion of, 541
deposition between its lamellæ, 213
dimple of, 492
effects of lime upon the texture of, 541
excessive development of, 546
excrescence from, V. ii—810
fistula of, V. i—490
gangrene of, 440
hernia of, 489
injuries of, 540
lacerated and incised wounds of, 541
lodgment of a foreign body upon or within, 541
mode in which it increases, 448
morbid vascularity of, 121, 493
on the characters of its anterior membrane, 429
opacities of, 444

Cornea, opaque, spontaneous disappearance of, V. i—[illegible]
    perforation of, 544
    remarks on its anatomy and physiology, 425
    sanguineous deposition between the lamellæ of, 447, 465
    simple acute inflammation of, 48
    sloughing of, 12, 44
    small-pox pustules upon, [illegible]
    spots of, 540
    staphyloma of, 552
    strumous inflammation of, 496
    sudden bursting of, during acute purulent ophthalmia, 182, 184
    ulcer of, 496
    various changes in the texture of, 545
Corpus ciliare, inflammation of, V. i—551, 553, 557
Crystalline lens and capsule, remarks on their anatomy and physiology, V. ii—[illegible]
        capsule, inflammation of, 32
Cuticular state of the conjunctiva, V. i—383, 386

Dacryoma, V. i—[illegible]
Day-blindness, V. i—282
Depression, cure of cataract by, 157
Dimple of the cornea, V. i—492
Dislocation of the eye-ball, V. ii—505
        lens, 42, 325
Distichiasis, 806
Dropsy of the eye-ball, 475
        lachrymal sac, 667

Ecchymosis, subconjunctival, V. i—407
Ectropium, V. i—129, V. ii—792
Effusion into the chambers of the eye of a milky fluid, V. i—612
        blood, 611
        pus, 606
Emphysema of the eye-lids, V. ii—839
        subconjunctival cellular membrane, V. i—423
Encanthis, V. ii—545
Entropium, 793, V. i—121
Epiphora, V. ii—635
Erysipelatous inflammation of the eye-lids, 736
        ophthalmia, V. i—305
Evulsion of the eye-ball, V. ii—514
Exophthalmos, 661
Exostosis of the orbit, 594
Extirpation of the eye-ball, 515
        lachrymal gland, 720
Extraction of cataract by lower section of the cornea, 131
        section of the sclerotica, 198
        upper section of the cornea, 142
Eye, anomalous forms of inflammation of, 529
    artificial, mode of introducing, V. i—525
    carbuncle of, 425
    foreign bodies attached to, 413
    inflammation of, consequent on parturition, V. ii—528
        occurring after cholera, 527
        fever, 525
    textures of, which are most obnoxious to scrofulous inflammation, V. i—342
Eye-ball, anomalous forms of disease, being of, or resembling affections of, a malignant nature, V. ii—465
    atrophy of, 494, V. i—126
        the muscles of, V. ii—572
    changes which occur in the muscles of, in the progress of various malignant diseases, 576

- Eye-ball, dislocation of, V. ii—503
  - dropsy of, 475
  - evulsion of, 514
  - extirpation of, 515
  - frozen, 513
  - fungus hæmatodes of, 380
    - causes of, 408
    - diagnosis of, 412
    - new operation proposed for the cure of, 428
    - prognosis of, 424
  - general inflammation of, 471
  - hypertrophy of the muscles of, 574
  - immobility of, 500
  - injuries of, 509
  - melanosis of, 446
    - causes of, 460
    - diagnosis of, 460
    - prognosis of, 462
    - textures in which it originates, 450
    - treatment of, 462
  - neuralgia of, 497
  - oscillation of, 502, 567
  - ossification of, 502
  - palsy of the muscles of, 554
  - protrusion of, 503
  - scirrhus of, 368
    - causes of, 374
    - origin and progress, 370
    - treatment, 374
  - spasm of the muscles of, 571
  - suppuration of, 486
    - consequent on gonorrhœal ophthalmia, V. i—219
    - produced by cholera, V. ii—490
  - tapping of the, for the relief of dropsical affections, 478
    - glaucoma, 19
    - inflammation of the membrane of the aqueous humor, and other forms of acute ophthalmic inflammation, V. i—85
  - want of correspondence in the action of the muscles of, V. ii—566
- Eye-lids, aneurism by anastomosis of, 781
  - burns and scalds of, 726
  - callosity of the margins of, 830
  - cancer of, 737
  - congenital perpendicular cleft in, 843
  - contusions of, 725
  - emphysema of, 839
  - erysipelatous inflammation of, 736
  - incised and lacerated wounds of, 729
  - injuries of, from caustic and other irritating substances, 729
  - inflammation of the edges of, 827
  - nævus maternus of, 773
  - œdema of, 837
  - peculiar ulceration of, 744
  - phlegmonous ulceration of, 734
  - spasm of, 824
  - syphilitic ulceration of, 740
  - twitching and quivering of, 823
  - tumours in, 755
    - arising from the tarsal cartilage, 756
    - common adipose, 761
    - common steatomatous, 762
    - encisted, 764
    - painful subcutaneous, 759

- Eye-lids, tumours in, solid, intimately connected with the skin, V. ii—756
  - warts upon, 768

- Far-sightedness, V. ii—216
- Fever, inflammation of the eye produced by, 525
- Fistula of the cornea, V. i—490
  - lachrymal sac, V. ii—700
    - operation for the cure of, 713
- Fungous enlargement of the lachrymal caruncle, 549
  - growths from the conjunctiva, V. i—120, 183, 391
    - iris, 721
- Fungus hæmatodes of the eye-ball, V. ii—380

- Gangrene of the cornea, V. i—183, 440
- Glasses, cataract, V. ii—200
  - for long-sightedness, 218
    - short-sightedness, 212
- Glaucoma inflammatoria, 12
    - causes of, 15
    - diagnosis of, 17
    - treatment of, 18
  - senilis, 8
    - treatment of, 12
  - state of the choroid coat in, 6
    - vitreous humor in, 4
- Gonorrhœal ophthalmia, acute, V. i—176
    - inquiry respecting its causes, 188
    - mild, 220
- Granular conjunctiva, 120, 339, 343
- Granulations of the conjunctiva, mode of removing, adopted by Banister, Read, Saunders, Vetch and Adams, 359

- Hairs growing from various parts of the conjunctiva, V. ii—809
- Hemiopia, 259
- Hemeralopia, 225
- Hernia of the cornea, V. i—489
- Hordeolum, V. ii—770
- Humor, vitreous, remarks on its septa and capsule, 1
- Hyaloid membrane, absorption of the septa of, 5
    - inflammation of, 5
    - opacity of, 23
    - ossification of, 23
    - thickening of, 23
    - vascularity of, 2
- Hydatids (?) beneath the conjunctiva, V. i—397, V. ii—542
  - in the orbital cellular membrane, V. ii—614
- Hydrophthalmia, 475
- Hypertrophy of the lachrymal gland, 646
    - muscles of the eye-ball, 574
- Hypoæma, V. i—611
- Hypopium, curious mode of treating, advised by Galen, Heister, and Vaugion, 608
  - varieties of, 606

- Immobility of the eye-ball, V. ii—500
- Injuries of the conjunctiva, V. i—402
    - cornea, 540
    - eye-ball, V. ii—509
    - lachrymal gland, 632
    - iris, V. i—725
- Iris, abscess of, 621, 724
  - absorption of, 726

- Iris, anatomical and physiological remarks respecting, V. i—614
  - arterious circles of, 622
  - change in its colour in the progress of inflammation, 620
  - congenital absence of, 761
    - defects in the form and magnitude of its pupillary aperture, 764
    - peculiarities in its colour, 762
  - foreign bodies in contact with, acquiring a cist, 725
  - fungous excrescences from, 721
  - inflammation of, 617
  - injuries of, 725
  - laceration of, 725
  - malignant disease originating in, 723
  - paralysis of, 757
  - prolapse of, 710
  - vacillation of, 747
- Iritis, arthritic, 689
    - causes of, 695
    - treatment of, 696
  - chronic, 653
  - pseudo-syphilitic, 661
  - rheumatic, 698
  - simple acute, 618
  - strumous, 700
    - administration of quina in, 708
  - syphilitic, 658
    - administration of turpentine in, 686
    - application of belladonna in, 687
    - does it most frequently occur after mercury has been administered for the cure of syphilis? 662
    - from what kind of chancre does it generally proceed? 679
    - peculiar characters of the lymph secreted in, 665
    - with what variety of cutaneous eruption is it generally associated? 681
- Irritable ophthalmia, 297

- Keratonyxis, V. ii—153

- Lachrymal calculus, V. ii—698
  - canaliculi, dilatation of, 675
    - obliteration of, 671
    - stricture of, 676
  - caruncle, atrophy of, 553
    - cancerous ulceration of, 549
    - chronic enlargement of, 545
    - fungous enlargement of, 549
    - inflammation of, 543
    - scirrhous enlargement of, 549
  - fistula of the eye-lid, 633
  - gland, atrophy of, 632
    - enlargement of, 646
    - extirpation of, 720
    - inflammation of, 637
    - injuries of, 632
    - lachrymal tumour in, 658
    - obstruction of its excretory ducts, 664
    - scirrhus of, 647
  - organs, acute inflammation of the excreting, 678
    - chronic inflammation of the excreting, 688
  - passages, method of probing, 717
  - puncta, congenital absence of, V. i—398, V. ii—719
    - constricted state of, V. ii—673

Lachrymal puncta, obliteration of, V. ii—671
patulous state of, 673
sac and nasal duct, injuries of, 672
congenital capillary aperture in, 719
dropsy of, 697
fistula of, 700
muscle of, 631
polypous within, 682, 696
secretion, diseased state of, 670
tumour beneath the conjunctiva, 668
Lacus lachrymalis, 696
Lagophthalmos, 814
Lens and its capsule, anatomical and physiological remarks respecting, 25
crystalline, becomes opaque soon after its displacement, 43
is it organized? 27
is it reproduced after it has been removed from the eye? 29
situation of when displaced by accident, 42
stated by Mr. Guthrie to have been reproduced after an operation for cataract, 31
dislocated, may resemble malignant disease, 43
sometimes presses upon the retina and occasions amaurosis, 50, 328
treatment of, 46
dislocation of, 42
induration of, 40
inflammation of, 39
opacity of, 55
ossification of, 51
position of, after the operation of depression and reclination, 163
sometimes varies in its size with respect to the comparative magnitude of the other parts of the eye-ball, 54
suppuration of, 40
ulceration of, 40
Leucoma, V. i—447
Lippitudo, V. ii—835
Liquor Morgagni, remarks on, 25

Macula lutea, absence of a cause of amaurosis, V. ii—310
Madarosis, 812
Melanosis of the eye-ball, V. ii—446
orbital cellular membrane, 450, 591
Membrana semilunaris, inflammation of, 543
Membrane of the aqueous humor, arbitrary division of, into three parts, named capsular, corneal, and irital, V. i—582
ossification of, 605
strumous inflammation of, 596
ulceration of, 605
Milium, V. ii—770
Morbid nictitation, 826
Morbillous ophthalmia, V. i—321
Morgagnian fluid, remarks on, V. ii—25
Muscæ volitantes, 68, 75, 218, 258
Muscle of the lachrymal sac, 631
Mydriasis, V. i—753
Myopia, V. ii—205
Myosis, V. i—750

Nasal duct, injuries of, V. ii—672
obstruction of, 692, 703
stricture of, 692
Near-sightedness, 205
Nebula of the cornea, V. i—437, 446
Nævus maternus of the eye-lid, V. ii—773

Neuralgia of the eye-ball, V. ii—497
Nictitation, morbid, 836
Night-blindness, 225
Nitrate of silver drops, effects of their continued use upon the conjunctiva, V. i—715
  ointment, effects of, in various morbid states of the cornea, 363
Nyctalopia, V. ii—232
Nystagmus, 570

Ocular inflammation, on the more important of the remedies employed for the subduction of, V. i—65
Œdema of the eye-lids, V. ii—837
  orbital cellular membrane, 588
  subconjunctival cellular membrane, V. i—307-423
Onyx, 433, 456
  mode of treating, 213
Opacity of the cornea, spontaneous disappearance of, 156, 444
  use of the sulphate of cadmium in, 455
Ophthalmia, acute gonorrhœal, 176
    purulent, in the adult, 104
  angularis, 298
  catarrhal, 90
  catarrho-rheumatic, 103
  chronic, often caused by tumours at the tarsal margin, or by an inverted cilium, 331
  Egyptian, 104
  erysipelatous, 305
  irritable, 297
  mode of protecting the eyes adopted in Egypt during its prevalence, 130
  morbillous, 321
  neonatorum, Dr. Ammon's opinion of the pathological state of the eye during the course of, 160
    inquiry respecting its causes, 161
  phlyctænodes, 221
  produced by reading or working near a bright gas-light, 232, 335
  purulent, of newly-born infants, 149
  pustular, 221
  scarlatinous, 321
  scrofulous, 233
  simple acute, 41
  slight purulent, 112
  tarsi, V. ii—827
  variolous, V. i—310
Ophthalmic artery, aneurism of, V. ii—627
    ossification of, a cause of amaurosis, 251
Ophthalmitis, 471
Ophthalmo-blenorrhæa, V. i—104
Optic nerve, state of, after extirpation of the eye-ball, 523
Optic nerves, various pathological conditions of, producing amaurosis, 248
Orbit, cist in, containing hydatids, 614
  dilatation of, 594
  disease of the bones of, 579, 653
  encisted tumour in, 606, 607, 609, 611, 613
  exostosis of, 594, 598, 600
  sarcomatous tumour in, 602, 603, 604, 605
Orbital adipose substance, diminution of, 617
    increase of, a cause of amaurosis, 310, 616
  aneurism by anastomosis, 618
  cellular membrane, œdema of, 588
    inflammation of, 579
    melanosis of, 591
    scirrhus of, 589

Orbital cellular membrane, suppuration of, V. ii—580
    tumours developed in, 592
    various morbid states of producing amaurosis, 510
Oscillation of the eye-ball, 252, 502, 567
Ossification of the capsule of the lens, 51
    choroid coat, V. i—786
    cornea, 544
Ossification of the eye-ball, V. ii—502
    hyaloid membrane, 23
    lens, 51
    membrane of the aqueous humor, V. i—605
    ophthalmic artery, producing amaurosis, V. ii—251
    retina, V. i—800, V. ii—247
    vessels of the choroid coat, V. i—787
Palsy of the muscles of the eye-ball, V. ii—554
    orbicularis palpebrarum, 814
Pannus, V. i—337, 366, 497
Paralysis of the iris, 757
    produced by a wound of the ciliary processes, 767
Parturition, inflammation of the eye consequent on, V. ii—628
Pediculi ciliorum, 834
Phlegmonous inflammation of the eye-lids, 734
Phlyctenula of the conjunctiva V. i—254
    cornea, 254
    eye-lids, V. ii—769
Photophobia, V. i—248, 790, 798
    inflammatory, V. ii—240
    phrenitic, 240
    strumous, 240, V. i—242, 248
    uterine, V. ii—241
Photopsia, 225, 257
Pigmentum nigrum, diminution of, a cause of amaurosis, V. i—786, V. ii—247
    is it a true membrane, V. i—770
    its precise situation, 771
Polypous growth within the lachrymal sac, V. ii—682, 696
    nasal duct, 707
Porriginous ophthalmia, V. i—325
Presbyopia, V. ii—216
Prolapse of the iris, V. i—125, 710
Proptosis, V. ii—503
Protrusion of the eye-ball, 503
Pseudo-syphilitic iritis, V. i—661
Psorophthalmia, 325
Pterygium, cause of its assuming a triangular figure, 368
    my opinions respecting its seat, and the mode in which it obtains a mucous covering, 374
    varieties of, 378
Ptosis, V. ii—815
    partial, sometimes congenital, 817
    use of strychnia in, 818, 821
Pupil, artificial, operation for, by detachment from the ciliary ligament, V. i—737, 744
        excision, 733, 744
        incision, 736, 744
    cause and objects of the contraction of, in iritis, 623
    congenital defects in its form and magnitude, 750, 761
    effects of belladonna upon, 650
    obliteration of, by adhesion of its margin to a mass of lymph, 729
        to the cornea, 729
        central accretion, 730
Pupillary membrane, cause of its disappearance, 758
    sometimes remains, 758

Pupillary membrane, treatment of when permanent, V. i—760
Puro-mucous ophthalmia, 324
Purulent ophthalmia of newly-born infants, 149
    period after birth at which it usually takes place, 153, 149
Pustular ophthalmia, 231
Pustules and phlyctenulæ, treatment of, when they form upon the conjunctiva or cornea, 293

Quivering of the eye-lids, V. ii—823

Reclination of cataract, 157
Relaxation of the conjunctiva, V. i—421
Retina, absorption of the pulpy matter of, 800
    anatomical and physiological remarks on, 788
    atrophy of, 800, V. ii—247
    concussion of, producing amaurosis, V. ii—328, V. i—727
    diminished sensibility of, V. i—790, V. ii—324
    effects of an unusually brilliant light upon, V. i—796, V. ii—265, 301
    increased sensibility of, V. i—242, 798
    inflammation of, 789
    opacity of, 800, V. ii—267, 274, 292, 336
    ossification of, V. i—800, V. ii—247
    softening of, V. i—800, V. ii—247
    thickening of, V. i—800, V. ii—247, 336
    varicosity of its vessels, V. i—798, V. ii—267, 292, 340, 341
    various pathological conditions of, causing amaurosis, V. ii—247
    vesicles attached to, V. i—800, V. ii—247
Retinitis, acute, V. i—242, 789
        what is the state of the pupil during the various stages of? 792
    chronic, 798
Rheumatic inflammation of the iris, 698
        sclerotica, 562
Rigidity of the palpebral integument, V. ii—841
Rupture of the cornea during acute purulent ophthalmia, V. i—122, 184

Scarlatinous ophthalmia, V. i—321
Scirrhous enlargement of the lachrymal caruncle, V. ii—549
Scirrhus of the eye-ball, 368
        lachrymal gland, 647
        orbital cellular membrane, 589
Sclerotica, excrescence from, 810
    rheumatic inflammation of, V. i—562
    simple acute inflammation of, 551
    staphyloma of, 503, 571
Semilunar membrane, inflammation of, V. ii—543
Sloughing of the cornea, V. i—124, 183, 440, V. ii—487
Solution, posterior operation of, V. ii—163
Spasm of the eye-lids, 824
        muscles of the eye-ball, 571
Spectral illusions, 238
Squinting, 555, 558, 574
Staphyloma of the choroid coat, V. i—503, 784
        cornea, 124, 317, 502
            causes of, 511
            mode in which the operation by excision produces its cure, 521
            treatment of, by caustic, 519—by excision, 520—by ligature, 520—by puncturing the eye-ball, 517—by seton, 518
            varieties of, 503
        iris, 503, 712, 716
        racemosum, 503, 712

Staphyloma of the sclerotica, V. i—503, 571, 785
sometimes mistaken for malignant disease, 577
Stillicidium lachrymarum, V. ii—635, 695
Strabismus, 555, 558, 574
Strumous children, classification of, V. i—236
conjunctivitis, 233
difference in the physical characters and mental manifestations of children suffering from, 237
importance of attending to the air, clothing, diet, and exercise of children affected with, 267
mercury to be very cautiously administered in, 274
inflammation of the cornea, 436
iris, 700
membrane of the aqueous humor, 596
Strychnia, use of in amaurosis, V. ii—282, 325, 353, 357, 818
ptosis, 818
Subconjunctival cellular membrane, changes wrought in by inflammation, V. i—426
circumscribed inflammation of, 421
minute abscesses in, 354
œdema of, 423, 426
watery cists and tumours within, 396, 398
emphysema, 423
phlegmon, 424
Suffusio colorans, V. ii—234
nigra, 242
Suppuration of the eye-ball, V. i—126, 173, V. ii—486
lachrymal sac, V. ii—699
Sycosis, V. i—349
Symblepharon, 183, 388, 404, V. ii—732
Synechia anterior, V. i—161, 631, 729, 741
posterior, 161, 631, 729, 742
Syphilitic inflammation of the iris, 658
ulceration of the eye-lids, V. ii—740

Tarsal cartilage, morbid conditions of, V. ii—773, 790, 801, 806
tumours arising from, 756
Tears morbid, 670
Tinea tarsi, 827
Trachoma, V. i—349
Trichiasis, V. ii—808
Tumours arising from the conjunctiva, V. i—398
in the eye-lids, V. ii—755
lachrymal gland, 658
orbit, 592
subconjunctival cellular membrane, V. i—397
near the eye-lid, removal of producing amaurosis, V. ii—308
near the tarsal margin, a cause of ophthalmic inflammation, V. i—50, 331
Turpentine, use of in syphilitic iritis, 648, 686
Twitching of the eye-lids, V. ii—823
Tylosis, V. i—349, V. ii—830, 837

Ulceration of the eye-lids, peculiar, V. ii—744
syphilitic, 740
tarsal margins, 835
Ulcers of the cornea, effects of, V. i—480
mode in which they heal, 477
varieties of, 469, 470, 471, 472
legs, suppression of discharge from, a cause of amaurosis, V. ii—358
Unguents, proper mode of applying them to the tarsal margin, 833
useful forms of, suited to the latter stages of ophthalmia tarsi, 834

Vacillation of the iris, V. i—747, V. ii—328
Variolous ophthalmia, 310
Vascularity of the cornea, 121, 337, 352, 493
Vision, coloured, V. ii—234
  double, 566
Visual defects, various forms of, in reference to colours, 234
Visus coloratus, 219, 234, 236, 259
  defiguratus, 259
  dimidiatus, 259
  interruptus, 259, 266
  magnificatus, 259
  multiplicatus, 259
  nebulosus, 75, 256
  obliquus, 259
  reticulatus, 259
Vitreous humor, changes in its colour, 22, 413
  deposition of lymph into, liable to be mistaken for fungus hæmatodes, 19, 412
  deposition of pus and lymph within, 17, 23, 412
  diminution of, 22
  dropsy of, 480
  fluidity of, 21
  hæmorrhage into its cells liable to be confounded with fungus hæmatodes, 23, 412
  increased density of, 21
  remarks on the anatomy of its septa and capsule, 1
Warts growing from the conjunctiva, V. i—395
  upon the eye-lids, V. ii—768
Watery cists in the subconjunctival cellular membrane, V. i—398, V. ii—769
Worms, amaurosis from, V. ii—253, 297
  beneath the conjunctiva, V. i—397, V. ii—538
  within the chambers of the eye, V. ii—538
    lens, 538
    Morgagnian fluid, 538
Wound above the eye-brow, a cause of amaurosis, 250, 307, 309
  of the lachrymal sac, a cause of lachrymal fistula of the sac, 672
  of the palpebra, a cause of lachrymal fistula of the eye-lid, 633, 730
    ptosis, 817

Xeroma, V. ii—634, 659, V. i—401

THE END.

---

PRINTED BY JAMES DRAKE, 52, NEW STREET, BIRMINGHAM.